AMJ Australasian Medical Journal [AMJ 2017;10(4):361–372]

# Knowledge and attitudes toward HPV vaccination among healthcare givers: First multicentre survey in Malaysia

Shabbir Ahmed Sheikh[1], Mainul Haque[2], Salwani Ismail[3], Uday Younis Hussein[3], and Nordin Bin Simbak[3]

1. Consultant Obstetrician &Gynecologist, King Saud Hospital, Onaizah, Al-Qassim, Saudi Arabia 51911
2. Faculty of Medicine and Defence Health, National Defence University of Malaysia, Kem Sungai Besi, 57000 Kuala Lumpur, Malaysia
3. Faculty of Medicine, Universiti Sultan Zainal Abidin, Medical Campus, Jalan Sultan Mahmud, 20400 Kuala Terengganu, Terengganu, Malaysia

## RESEARCH

Please cite this paper as: Sheikh SA, Haque M, Ismail S, Hussein UY, Simbak NB. Knowledge and attitudes toward HPV vaccination among healthcare givers: First multicentre survey in Malaysia. AMJ 2017;10(4):361–372.
https://doi.org/10.21767/AMJ.2017.2954

**Corresponding Author:**
Mainul Haque
Professor, Unit of Pharmacology
Faculty of Medicine and Defence Health
National Defence University of Malaysia
Kem Sungai Besi, 57000 Kuala Lumpur, Malaysia
Email: runurono@gmail.com

## ABSTRACT

**Background**

Cervical cancer is an important public health concern worldwide, and in both developed and developing countries. In Malaysia, cervical cancer is the second most common cancer in women after breast cancer and colorectal cancer. The relation between cervical cancer and oncogenic human papillomavirus (HPV) infection has been well-established and it has been reported that almost all cervical cancers are correlated to oncogenic HPV DNA. Worldwide around 70 per cent of cervical cancer cases are caused by HPV type 16 and HPV type 18 and responsible for 90 per cent of penile and anal cancer in men. However, HPV type 6 and 11 cause over 90 per cent of genital warts in both men and women.

**Aims**

The objective was to assess the knowledge and attitude level among health givers and to compare among the groups.

**Methods**

This was a cross-sectional multi-centre study. Simple random sampling was adopted to collect the data. A questionnaire has been developed and it was pretested. Medical doctors and nurses of Malaysian health service were the study population. The data was evaluated with the necessary statistical tests as applicable. P-values <0.05 was considered statistically significant.

**Results**

Total participants of this study were 629. They mainly doctor and nurses. The average age was 31.68±7.20 years. Regarding HPV vaccination, their mean knowledge and attitude scores (SD) were 13.32±2.30 and 9.38±1.45 respectively.

**Conclusion**

Medical doctors have statistically significantly higher knowledge and attitude scores than paramedical staff. Knowledge level was statistically significantly correlated with attitude. More in-depth prospection interventional research has been advocated to safeguard the Malaysian population from the atrocities of cervical cancer.

**Key Words**

Knowledge, attitudes, HPV, healthcare givers, Malaysia

## What this study adds:

**1. What is known about this subject?**

Globally, there are several studies regarding knowledge and attitude regarding HPV vaccination among patient and health professionals.

**2. What new information is offered in this study?**

This study finding is the first ever multi-centre study in Malaysia health care givers about their knowledge and attitude level and comparison among the groups.

**3. What are the implications for research, policy, or practice?**

Hopefully, current study findings will serve as base line for health policy planners and to safeguard Malaysian nationals from the impending atrocities of HPV.

## Background

### General Overview

Cervical cancer is an important public health concern worldwide, and in both developed and developing countries. Cervical cancer, after breast cancer, well-thought-out a preventable disease, but remains as the second most common cause of cancer executioner among women worldwide, with an estimated 500,000–529,000 new cases and 270,000–275,000 deaths occurring every year and principally in developing countries.[1,2] In Malaysia, cervical cancer was the second most common cancer in women after breast cancer and colorectal cancer.[3] The relation between cervical cancer and oncogenic human papillomavirus (HPV) infection has been well-established and it has been reported that almost all cervical cancers are correlated to oncogenic HPV DNA.[4] Worldwide around 70 per cent of cervical cancer cases are caused by HPV type 16 and HPV type 18[5–7] and responsible for 90 per cent of penile and anal cancer in men.[8] However, HPV type 6 and 11 cause over 90 per cent genital warts in both men and women.[9–11] Prophylactic HPV vaccines have been developed to prevent HPV-related cervical cancer.[12,13] Three vaccines are permitted by the Food and Drug Administration (FDA), USA to prevent and protect from HPV infection: Gardasil, Gardasil 9, and Cervarix.[14] All three vaccines prevent infections with HPV types 16 and 18, two high-risk HPVs that cause about 70 per cent of cervical cancers and an even higher percentage of some of the other HPV-associated cancers.[15,16] Gardasil also prevents infection with HPV types 6 and 11, which cause 90 per cent of genital warts.[17] Gardasil 9 prevents infection with the same four HPV types plus five additional high-risk HPV types.[18,19] The HPV vaccination program has been strongly endorsed by the World Health Organization (WHO) for introduction and scaling-up globally.[20] Till 2013, there are more than 160 countries accepting the prophylactic use of HPV vaccines and progressively considering to introduction of the vaccines into the national immunization program.[21]

### A Brief of about Knowledge and Attitude regarding Cervical Cancer and Pap Smear in Malaysian Population

Seventy-two-point five per cent (72.5 per cent) of female staff of the Management and Science University (MSU), Shah Alam, Malaysia had heard about Pap smear test and 57.7 per cent got this information from doctors, 43 per cent from printed material, and 31 per cent from the media. The barriers to Pap smear test include place of screening (15.5 per cent) which was mentioned as the main barrier, followed by the lack of time (11.3 per cent).[22] Another study conducted among medical students of the private medical school of Malaysia and indorsed that main barrier for women are the lack of consciousness (n=16; 70 per cent), followed by shyness (n=12;52 per cent) and the cost of the test (n=12;52 per cent).[23] A cross-sectional study among 287 female students at a tertiary institution located in Selangor, Malaysia reported that the prevalence of ever having had a Pap test was six per cent. It has been revealed that some misunderstanding exists regarding Pap smear test among young women. Most of the participants had adequate knowledge about risk factors for cervical cancer. The study finally suggested about the incorporation of reproductive health subjects for all university students.[24] Another study conducted among the women residents of Petaling Jaya, Selangor, Malaysia revealed that 56 per cent of the respondents ever had a Pap smear test. Knowledge of signs and symptoms, age, the number of pregnancies, marital status, education level and religion were found to be significant correlates of Pap smear screening. This study also found it is not the knowledge but anecdotal beliefs hinder cervical cancer detection and therefore, culturally sensitive screening process should be encouraged.[25] One more Malaysian study conducted with 403 female teachers from 40 public secondary schools. The rate for participants had Pap test was only 38 per cent and poor practice was mainly observed among those with aged less than 35 years; practicing hormonal contraceptive; and barriers to the Pap test. The study findings were significantly lower in women with a very long period of teaching; affluent groups; ever pregnant; chronic diseases; health insurance coverage; and professed benefit of Pap test. Tailor made culturally sensitive health service with the educational program has been advocated again for prevention cervical cancer.[26] Another study conducted among the housewives in the state of Kelantan found that 51.4 per cent of them has done Pap smear test at least three years back and only once in a lifetime. Poor knowledge level, time constraint, felt unnecessary and shy were the principal determining factor for deterring Pap smear test. It is also observed that practices of pap test among rural people were low and related to age and educational level.[27]

**A Brief of about Knowledge and Attitude regarding Cervical Cancer and Pap Smear in Overseas Population**

One Chinese study among medical students' revealed inadequate levels of HPV-related knowledge and limited acceptability regarding HPV vaccination. The study also recommended that HPV educational program ought to be scientifically incorporated into the course curriculum of medical education to promote cognizance of HPV vaccination.[28] Another Chinese cross-sectional multicentre study was conducted among 13,375 women from the general population, government officials, and healthcare providers. This study revealed that knowledge was low among the general female population and only 24 per cent of them had ever heard of HPV. Less than 20 per cent of healthcare providers documented sexually naïve women as the most suitable for HPV vaccination. Although only 6 per cent of study respondents agreed to pay for HPV vaccine costing US$ 600 but high acceptance of HPV vaccine was observed among all the study groups. Finally, this study concluded intense educational program is obligatory to promote HPV-related knowledge and its vaccine.[29] Another multicentre cross-sectional study of Iran among parents of high and middle school students regarding HPV and related diseases were evaluated. About 76 per cent of parents had no information about HPV and diseases. Educational level and age had a significant impact on knowledge of parents about HPV. Finally, researcher recommended well designed and persuasive educational interventions for improving knowledge level and preventing HPV and related diseases.[30] An investigation conducted in 2013 among 2,150 medical students at six medical schools across southwest China utilizing a 58-item inventory concerning about knowledge and perceptions of HPV, cervical cancer, and HPV vaccines. This research revealed that 48.8 per cent and 80.1 per cent thought cervical cancer can be prevented by HPV vaccines and screening respectively, while 60.2 per cent and 71.2 per cent would like to receive or recommend HPV vaccines and screening. 35.4 per cent thought HPV vaccines ought to be given to adolescents aged 13–18 years. Thirty-two per cent stated that women should start to undergo screening from the age of 25. Forty-nine-point two per cent felt that women should receive screening every year. The acceptability of HPV vaccines and cervical cancer screening is comparatively low among medical students in southwest China. The study advocated undertaking proper instructive interventions to promote and progress knowledge level about cervical cancer, HPV-related diseases its vaccines and Pap smear test among medical students.[31] One more study found that integration of didactic lecture-based educational intervention in public universities medical education curriculum promoting HPV-related knowledge and vaccine acceptability.[32]

**Hypothesis, Problem Statement/ Research justification, Study Objectives**

The knowledge and attitudes toward HPV vaccination among healthcare givers are inadequate. Although there were several studies conducted among different study populations regarding knowledge, attitude, and practice regarding cervical cancer, HPV and related diseases and its vaccine; but to date, no study has been done to assess the knowledge and attitudes towards HPV vaccination of the healthcare givers in Malaysia. The study objectives are:

i. To assess the level of knowledge of the medical Staff toward HPV vaccination
ii. To assess the attitude of the paramedical Staff toward HPV vaccination
iii. To determine the barriers to HPV vaccination
iv. To provide the database of the attitudes toward the HPV vaccination in Malaysia.

## Method

**Study Design**: This was a cross-sectional multi-centre study among healthcare givers in five Malaysian states using multistage sampling method.

**Sampling Method and Sample size calculation**: Simple random sampling was adopted to collect the data. Power & Sample Size Program version 3.0.43 was utilized to calculate sample size. The study was planned of a continuous response variable from independent control and experimental subjects with 1 control(s) per experimental subject. If the true difference in the experimental means is 0.47, we will need to study 1,000 experimental subjects to be able to reject the null hypothesis that the population means of the experimental and control groups are equal with probability (power) 0.8. The Type I error probability associated with this test of this null hypothesis is 0.05.

**Statistical Analysis**: The data was analyzed with application of SPSS version 22. Descriptive statistics such as frequency (per cent), and mean and standard deviation (SD) was applied for categorical data and for numerical data respectively. Pearson's correlation was applied for correlation between knowledge score and attitude score whereas independent t-test was applied for comparing the mean scores between medical and paramedical staff. P-values <0.05 was considered the level of significance for this study.

**Inclusion Criteria** (Male and females): 1- Obstetrics and gynaecology doctor. 2- Paediatric doctor. 3- General

Practitioner. 4- Sisters (O & G, Paediatric & Community). 5- Nurses (O & G, Paediatric & Community).

**Exclusion Criteria**: 1. Administration staff. 2. Other medical disciplines.

**Method**: A questionnaire has been developed and it was pretested. The content validity was evaluated by the University Sultan Zainal Abidin (UniSZA), Malaysia experts. Each respondent completed the questionnaire which was validated with pilot study among 20 healthcare staff. The pilot study showed the validity and reliability results were within the standard range. Obviously, those participated in the pretested program were excluded from the main study. All information regarding aims of this research project and consent form were designed and orally explained to the respondents, and the informed consent was obtained before data collection. The hard copy of the questionnaire was given to each respondent to answer in twenty to thirty minutes. Strict research ethics were maintained. A total of one thousand (1,000) respondents were calculated to be recruited from five states of Malaysia (Terengganu, Kedah, Johor, Kuala Lumpur and Sarawak). Five categories of medical and paramedical staff were included from hospitals and GP clinics in each state. Each category is represented by forty respondents. Sites visits were done by the primary investigator with the aim of conducting sessions for data collection by filling the questionnaire by the categories of the staff involved. The aims of the research were explained to the respondents and informed consent was obtained before data collection. The hard copy of the questionnaire was given to each respondent to answer in twenty to thirty minutes.

## Results

### Socio-Demographic Characteristics of All Respondents

There were altogether 629 staff from the five Malaysian states: Terengganu (104, 16.5 per cent), Kedah (129, 20.5 per cent), Johor (152, 24.2 per cent), Kuala Lumpur (101, 16.1 per cent), Sarawak (143, 22.7 per cent). Professionally study respondents were Obstetrics and gynaecology doctor (216, 33.3 per cent), Paediatric doctor (104, 16.5 per cent), General Practitioner (3, 0.5 per cent), Sisters (24, 3.8 per cent), Nurses (262, 41.7 per cent). The rest twenty participants (3.2 per cent) did not answer about their professions. There were 323 (53.0 per cent) medical staff and 286 (47.0 per cent) paramedical staff in this study with male and female distribution of 108, 17.2 per cent and 521, 82.8 per cent respectively. The average age was 31.68±7.20 years. The ethnic origin of study respondents was from Malay (457, 72.7 per cent), Chinese (104, 16.5 per cent), Indian (42, 6.7 per cent), others [23, 3.7 per cent (Bidayuh, Dusun, Ibans, Javanese, Melanau, Punjabi, Sikh)]. Their religion was Muslim (461, 73.3 per cent), Christian (70, 11.1 per cent), Buddha (59, 9.4 per cent), Hindu (35, 5.6 per cent), others [2, 0.3 per cent (Sikh or Sikhism)]. Their educational level was Diploma (284, 45.2 per cent), Bachelor degree (303, 48.2 per cent), and Masters/PhD (38, 6 per cent). Again, their years of practice was <5 years (318, 50.6 per cent), 5-10 years (126, 20 per cent), 10-15 years (101, 16.1 per cent), >15 years (84, 13.4 per cent). The details of sociodemographic are data depicted in Table 1.

**Table 1: Socio-demographic characteristics of all respondents (n=629)**

| Variables | Frequency (%) | Mean (SD) |
|---|---|---|
| **Profession** [a] | | |
| GP | 3 (0.5) | |
| O&G doctor | 216 (33.3) | |
| Pediatrician | 104 (16.5) | |
| Nurse | 262 (41.7) | |
| Sister | 24 (3.8) | |
| **Gender** | | |
| Male | 108 (17.2) | |
| Female | 521 (82.8) | |
| **Age (n= 539)** | | 31.68 (7.20) |
| **Race** [b] | | |
| Malay | 457 (72.7) | |
| Chinese | 104 (16.5) | |
| Indian | 42 (6.7) | |
| Others | 23 (3.7) | |
| **Marital Status** [d] | | |
| Married | 397 (63.1) | |
| Single | 230 (36.6) | |
| **Religion** [e] | | |
| Muslim | 461 (73.3) | |
| Christian | 70 (11.1) | |
| Buddha | 59 (9.4) | |
| Hindu | 35 (5.6) | |
| Others | 2 (0.3) | |
| **Educational Level** [f] | | |
| Diploma | 284 (45.2) | |
| Bachelor degree | 303 (48.2) | |
| Masters/PhD | 38 (6.0) | |
| **Years in Practice** | | |
| <5 years | 318 (50.6) | |
| 5–10 years | 126 (20.0) | |
| 10–15 years | 101 (16.1) | |
| >15 years | 84 (13.4) | |

Missing Value: a=20 (3.2), b=3 (0.5), c=1 (4.3), d=2 (0.3), e=2 (0.3), f=4 (0.6).

The correct answers of all study participants to knowledge towards HPV vaccination were 64.4 per cent and incorrect answers were 36.6 per cent. Details of knowledge answers were depicted in Table 2. The mean and 95 per cent CI of knowledge scores for each group were shown in Figure 1. The mean knowledge scores (95 per cent CI) of medical staff and paramedical staff was shown in Figure 2. Concerning attitude towards HPV vaccination, the correct answers were 55.3 per cent and incorrect answers were 44.7 per cent among all participants. HPV vaccine easily accessible for you? Yes=72.8 per cent, and No=37.2 per cent. The price of HPV vaccine? Cheap=2.1 per cent, Acceptable=49.4 per cent, and Expensive=48.5 per cent. Details of attitude answers are presented in Table 3. The mean and (95 per cent CI) of attitude scores are illustrated in Figure 3 and 4.

**Table 2: Knowledge of All Study Participants towards HPV Vaccination (n=629)**

| Variables | Frequency (%) |
|---|---|
| **HPV common cause of cervical cancer** | |
| Yes (Correct) | 612 (97.3) |
| No | 17 (2.7) |
| **Cervical cancer is a major public health problem in Malaysia** | |
| Yes (Correct) | 477 (75.8) |
| No | 152 (24.2) |
| **Cervical cancer is the leading cause of cancer-related death in Malaysia** | |
| Yes | 363 (57.7) |
| No (Correct) | 266 (42.3) |
| **HPV is a common sexually transmitted infection** | |
| Yes (Correct) | 512 (81.4) |
| No | 117 (18.6) |
| **Multiple sex partners' increases risk of HPV infection and cervical cancer** | |
| Yes (Correct) | 603 (95.9) |
| No | 26 (4.1) |
| **Condom is protective against HPV infection** | |
| Yes (Correct) | 451 (71.7) |
| No | 178 (28.3) |
| **HPV infection cause no symptoms in majority of cases** | |
| Yes | 537 (85.4) |
| No (Correct) | 92 (14.6) |
| **HPV is also linked to** | |
| Vaginal cancers | 274 (43.6) |
| Penile cancers | 40 (6.4) |
| Genital warts (Correct) | 229 (36.4) |
| All above | 86 (13.7) |
| **HPV infection in men is as important as in women** | |
| Yes (Correct) | 435 (69.2) |
| No | 194 (30.8) |
| **How can cervical cancer be prevented?** | |
| Pap smear | 152 (24.2) |
| Vaccination (Correct) | 426 (67.7) |
| All above | 51 (8.1) |
| **Who is eligible for the HPV vaccine (Target groups)** | |
| All males aged 9-26 years | 30 (4.8) |
| All females aged 9-26 years | 552 (87.8) |
| All above (Correct) | 47 (7.5) |
| **HPV vaccination can be given up to max age of** | |
| 45 years (Correct) | 298 (47.4) |
| 35 years | 130 (20.7) |
| 26 years | 201 (32.0) |
| **How many are the doses of HPV vaccine** | |
| Two | 150 (23.8) |
| Three (Correct) | 479 (76.2) |
| **Vaccination safe & effective** | |
| Yes (Correct) | 611 (97.1) |
| No | 18 (2.9) |
| **To date, Protection of HPV vaccine lasts for** | |
| 5 years | 204 (32.4) |
| 8 years | 97 (15.4) |
| 10 years (Correct) | 328 (52.1) |
| **HPV vaccine is also recommended for males** | |
| Yes (Correct) | 373 (59.3) |
| No | 256 (40.7) |
| **Best time to give HPV vaccine is before sexual exposure** | |
| Yes (Correct) | 590 (93.8) |
| No | 39 (6.2) |
| **Is this vaccination safe during pregnancy?** | |
| Yes | 179 (28.5) |
| No (Correct) | 450 (71.5) |
| **Prevents HPV transmission** | |
| Yes | 382 (60.7) |
| No (Correct) | 247 (39.3) |
| **Male vaccination prevents HPV transmission to his partner** | |
| Yes (Correct) | 432 (68.7) |
| No | 197 (31.3) |
| **HPV vaccine can be given even previous history** | |
| Yes (Correct) | 418 (66.5) |
| No | 211 (33.5) |

Correct Answer Average=64.41%; Incorrect Answer=36.59%

**Figure 1: Mean and 95% CI of total knowledge scores among all staff (n =609)**

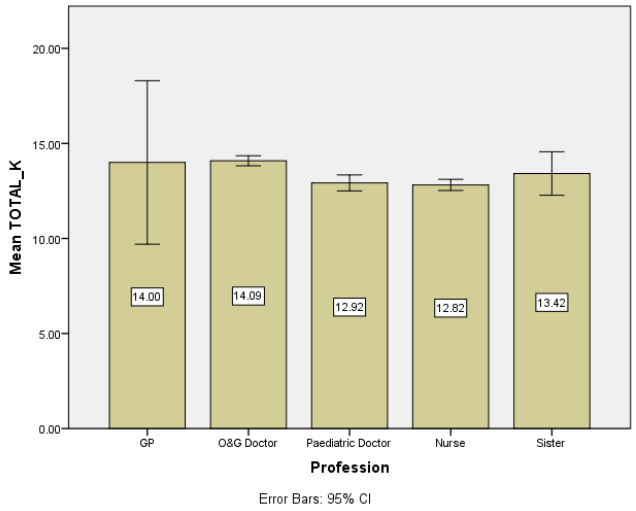



**Figure 2: Mean knowledge scores (95% CI) of medical staff and paramedical staff (n =609)**

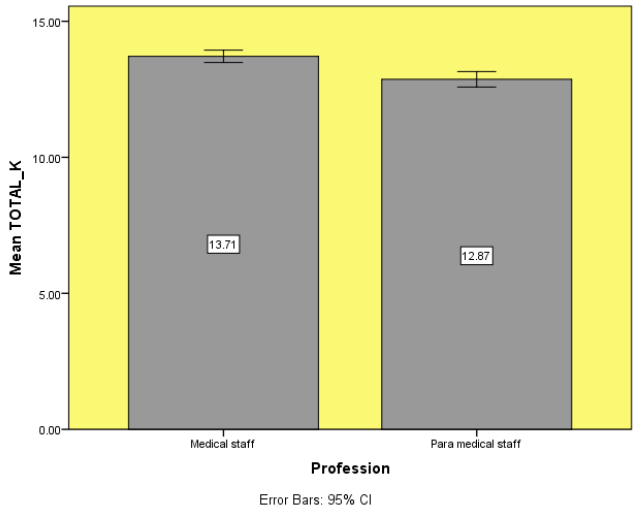



**Table 3: Attitude of All Study Participants Medical Staff Towards HPV Vaccination (n=629)**

| Variables | Frequency (%) |
|---|---|
| **HPV vaccine easily accessible for you** | |
| Yes | 458 (72.8) |
| No | 171 (27.2) |
| **The price of HPV vaccine** | |
| Cheap | 13 (2.1) |
| Acceptable | 311 (49.4) |
| Expensive | 305 (48.5) |
| **Willingness HPV vaccine** | |
| Yes (Correct) | 484 (76.9) |
| No | 60 (9.5) |
| Need information | 85 (13.5) |
| **Procedure vaccination** | |
| Appropriate (Correct) | 607 (96.5) |
| Not appropriate | 22 (3.5) |
| **Needs HPV vaccination** | |
| Male (Correct) | 24 (3.8) |
| Female | 486 (77.3) |
| all above | 119 (18.9) |
| **Recommend vaccination** | |
| Your son (Correct) | 19 (3.0) |
| Your daughter | 263 (41.8) |
| Your relatives | 177 (28.1) |
| Your patients | 92 (14.6) |
| all above | 78 (12.4) |
| **Support vaccination** | |
| Yes (Correct) | 604 (96.0) |
| No | 25 (4.0) |

Average Correct Answer=55.26%, Incorrect Answer=44.74%.

**Figure 3: Mean and 95% CI of total attitude scores among all staff (n =609)**

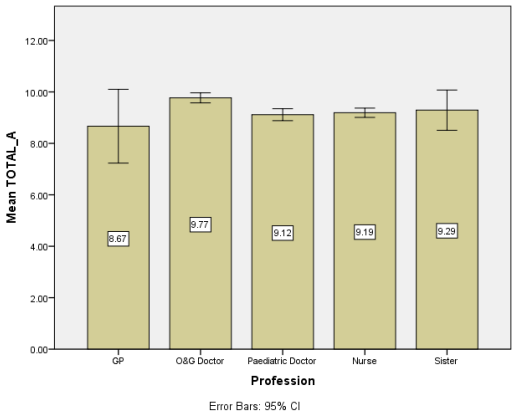
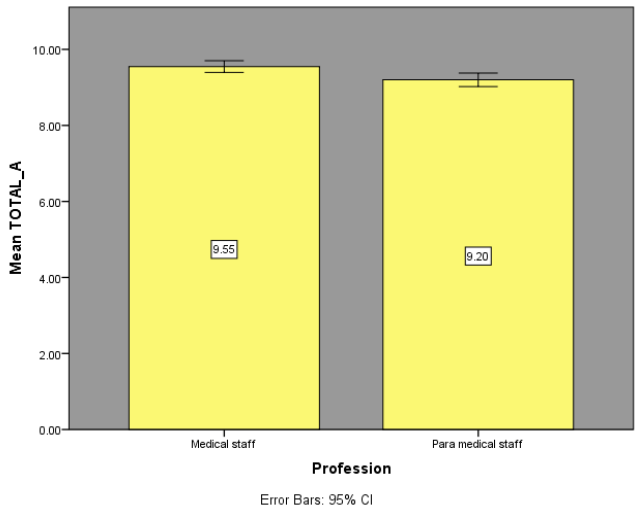



**Figure 4: Mean attitude scores (95% CI) of medical staff and paramedical staff (n =609)**



**Barriers and Source of Information regarding HPV Vaccine**

Barriers to HPV vaccination are described detail in Table 4 and Figure 5. Barriers were: i. fear of injection: Yes (42.1 per cent) No (57.9 per cent); ii. Worried of vaccine safety: Yes (86 per cent) No (14 per cent); iii. Need assurance: Yes (97.6 per cent) No (2.4 per cent); iv. Increase risk in sexual behaviour: Yes (45.9 per cent) No (54.1 per cent). Among the study participants, 97.5 per cent were aware of Pap smear test (Table 5 and Figure 6). The source of the information regarding HPV vaccine were from healthcare givers (66.8 per cent), the internet (6.8 per cent), friend (3.2 per cent), books and newspapers (5.9 per cent), TV (2.9 per cent), all above (14 per cent), and no (0.5 per cent). The source of information about HPV vaccine among respondents is illustrated in Table 5 and Figure 7.

**Table 4: Barriers to HPV vaccination (n=629)**

| Variables | Frequency (%) |
|---|---|
| **Fear of injection** | |
| Yes | 265 (42.1) |
| No | 364 (57.9) |
| **Worried vaccine safety** | |
| Yes | 541 (86.0) |
| No | 88 (14.0) |
| **Need assurance** | |
| Yes | 614 (97.6) |
| No | 15 (2.4) |
| **Increase risk in sexual behavior** | |
| Yes | 289 (45.9) |
| No | 340 (54.1) |

**Table 5: Source of information about HPV vaccination and Pap smear (n=629)**

| Variables | Frequency (%) |
|---|---|
| **Have you heard of Pap smear?** | |
| Yes | 613 (97.5) |
| No | 16 (2.5) |
| **Heard of HPV vaccine** | |
| By healthcare giver | 420 (66.8) |
| By internet | 43 (6.8) |
| By friend | 20 (3.2) |
| By books or newspaper | 37 (5.9) |
| By TV | 18 (2.9) |
| All above | 88 (14) |
| No | 3 (0.5) |

**Figure 6: Heard about pap smear among subjects (n = 629)**

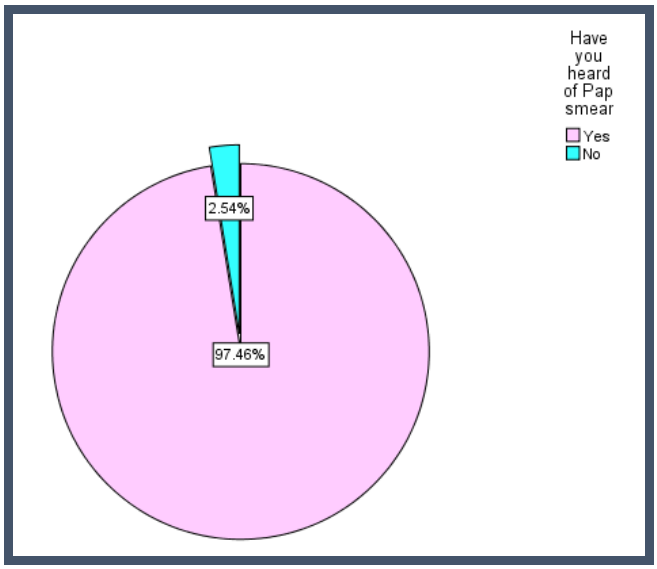
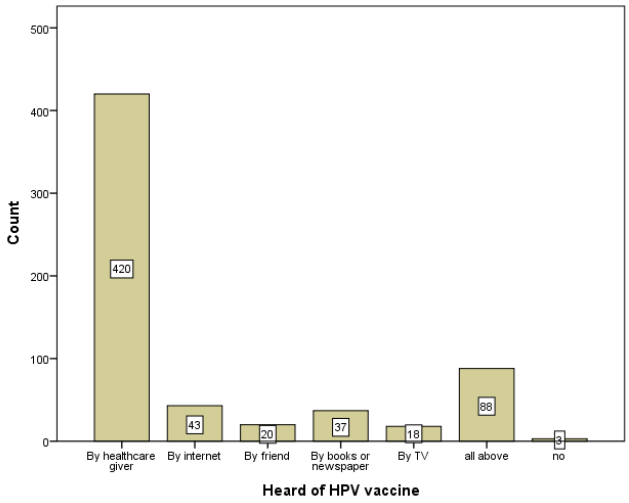



**Figure 7: Source of information about HPV vaccine among respondents (n =629)**




**Correlation and Comparison between Knowledge and Attitude Scores of Respondents**

The mean knowledge score (SD) of all respondents was 13.32(2.30) and the mean attitude score (SD) was 9.38(1.45) (Table 6). There was statistically significant positive (direct) fair correlation between knowledge and attitude scores when Pearson's correlation test was applied (r=0.309, $p$<0.001) (Table 7 and Figure 8). There was statistically significant (r=0.309, $p$<0.001) positive (direct) fair correlation between knowledge and attitude scores when Pearson's correlation test was applied (Table 7 and Figure 8). There was significant difference ($p$<0.001) with Independent t-test, of mean knowledge score (SD) between medical staff 13.71±2.09 and paramedical staff 12.87±2.43 (Table 8). Moreover, regarding attitude scores, there was

also significant difference (p=0.003) with Independent t-test of mean attitude score (SD) between medical staff 9.55±1.40 and paramedical staff was 9.20±1.51 (Table 9).

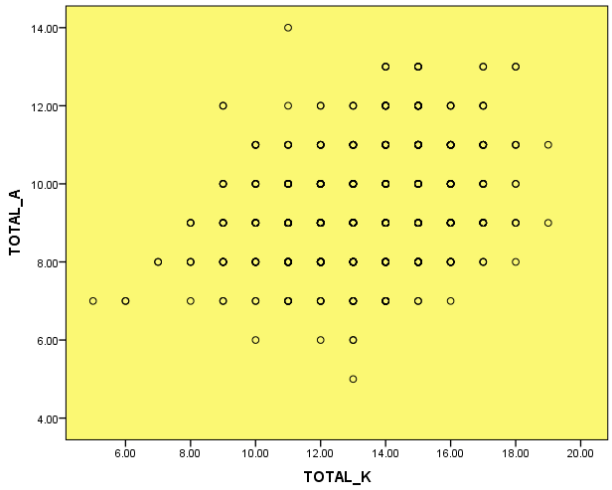
**Table 6: Knowledge and Attitude Scores of Respondents**

| Variables | Mean (SD) | Minimum | Maximum |
|---|---|---|---|
| Knowledge score of all respondents (n= 629) | 13.32 (2.30) | 5 | 19 |
| Attitude score of all respondents (n = 629) | 9.38 (1.45) | 5 | 14 |

**Table 7: Correlation between knowledge and attitude scores of respondents (n=629)**

| Attitude scores | | |
|---|---|---|
| | *r* | *p* value* |
| Knowledge scores | 0. 309 | <0.001 |

**Figure 8: Scatter plot showing the relationship between total knowledge scores and total attitude scores (n =629)**




## Discussion

### Sociodemographic Data

The response rate of the students for this study was 62.9 per cent, which is very like many research reports.[32,33] In this study, female medical students were outnumbered by their male counterparts. This finding is analogous to that of several studies in many other countries.[35–39] Malaysia is mainly Malay predominant and a Muslim country. Therefore, much of the study population were Malays and Muslims (Table 1).

### Knowledge and Attitude Level

The knowledge level of current study participants was found to be 64.41 per cent towards HPV vaccination (Table 2) which is considered more than average. This is in reverse of research studies findings from China and India where both the studies reported that the knowledge level was low.[40,41] Medical education had an ultimate influence in the development of important public health issue including HPV-related diseases and its' vaccine.[42] As the study population was a health professionals, therefore, they have better knowledge level regarding cervical cancer, HPV, and its' vaccination. Correct answer was 55.3 per cent among the respondents regarding attitude. This finding can be considered as an average (Table 3). Although, it is more than 50 per cent but all the study participants are health professionals and currently working in Malaysian health service. Again, most of them are medical doctors. Therefore, the better attitudinal outcome was expected. Nevertheless, three research reports from Saudi Arabia, Hong Kong, and the UK reported that the attitude and awareness level found low. [43–45] Consequently, the current study were findings slightly higher than previous overseas studies but low from another British study among the general population.[46]

### Barriers and Information Regarding HPV Vaccine

The current study participants identified many issues regarding barrier of HPV vaccination. Those were fear of injection, worried about vaccine safety, need assurance, increase risk in sexual behavior. Fear of injection exists in many communities throughout the world. As this vaccine is relatively new, hence, worry about the safety can be considered as common human behavior. The common barriers reported by many studies includes lack of knowledge; parental concern regarding the safety of the vaccine in minor and adolescent; financial concern including insurance coverage, high cost, inadequate reimbursement; vaccine effectiveness; and the high possibility of HPV infection.[47–50] The major concern was financial issue but the current study did not able to detect such issue among Malaysian health professionals. The great majority of the study participants know about Pap smear test. This may be explained as the study participants were health professionals; henceforth, it is expected that they will be acquainted with all recent public health issue and prevention. Even though all study participants were health professional but most of them heard about HPV vaccine from healthcare givers. None have reported that they learn from their course curriculum and this might be because HPV vaccine was first available in 2006[51] and the current study participants mean age were 31.68±7.20 years and this

recent vaccine product yet to be incorporated in medical and paramedical educational curriculum.

**Correlation between Knowledge and Attitude Score**

Several previous studies reported that educational intervention improved knowledge level resulting in improved attitude.[52,53] Several researchers concerning with diabetes mellitus, addiction, and cervical cancer informed that high knowledge level was related with improved attitudinal change.[54–56] The current study knowledge level was significantly related to attitude. Thereafter, these study findings were in the same line with earlier many studies.[52–56] The current study showed significantly higher levels of knowledge and attitude among medical doctors than that of non-medical health professionals. This is obvious because of their high educational and service pattern of the medical doctor than nurses. Nonetheless, one Indian study found both group medical and paramedical having a poor level of knowledge and attitude level.[57] One more study from South African medical doctors of a tertiary care hospital found their knowledge and attitude both were poor about HPV infection and its' vaccination.[58]

## Limitation of the Study

This is a cross-sectional study with its own inherent limitations. Therefore, this is the only snapshot of perception of professionalism of medical students of UniSZA. The sample size was 626 and randomly selected but in comparison of total health professionals of Malaysia in both public and private sector, it looks small. Moreover, only 5 states can be included in the current study as because of financial and time constraint. Hence this study finding cannot be generalized for the whole country. Therefore, the findings in this study will only be served as baseline data for the in-depth study.

## Conclusion

The current study found that both medical and paramedical staffs have moderately good levels of knowledge towards HPV vaccination. However, the attitude level was found to be average. The study participants' knowledge and attitude level were significantly correlated. Among the study participants', medical doctors have better knowledge and attitude level than the nurse. Hopefully, the current research findings will serve future more in-depth prospective interventional studies to find the safety measures for the Malaysian population from the obscenity of cervical cancer.

## References


1. Ferlay J, Shin HR, Bray F, et al. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. Int J Cancer. 2010;127(12):2893–2917.
2. World Health Organization. Sexual and reproductive health. Cancer of the cervix. Available at: http://www.who.int/reproductivehealth/topics/ [Accessed on 23-12-2016]
3. Kwang NB, Yee CM, Shan LP, et al. Knowledge, perception and attitude towards human papillomavirus among pre-university students in Malaysia. Asian Pac J Cancer Prev. 2014;15(21):9117–9123.
4. Uzunlar O, Özyer S, Baser E, et al. A survey on human papillomavirus awareness and acceptance of vaccination among nursing students in a tertiary hospital in Ankara, Turkey. Vaccine. 2013;31(17):2191–2195.
5. Division of STD Prevention. Prevention of genital HPV infection and sequelae: report of an external consultants' meeting. Atlanta, GA: Centers for Disease Control and Prevention. 1999. Available at: https://www.cdc.gov/std/hpv/hpvsupplement99.pdf [Accessed on 23-12-2016]
6. Gerberding JL. Department of Health and Human Services. Centers for Disease Control and Prevention. Prevention of Genital Human Papillomavirus Infection. 2004. Available at: https://www.cdc.gov/std/hpv/2004hpv-report.pdf [Accessed on 23-12-2016]
7. Winer RL, Hughes JP, Feng Q, et al. Condom use and the risk of genital human papillomavirus infection in young women. N Engl J Med. 2006;354(25):2645–2654.
8. Daling JR, Sherman KJ. Relationship between human papillomavirus infection and tumors of anogenital sites other than the cervix. IARC Sci Publ. 1992;(119):223–241.
9. Insinga RP, Dasbach EJ, Myers ER. The health and economic burden of genital warts in a set of private health plans in the United States. Clin Infect Dis. 2003;36(11):1397–1403.
10. Moscicki A-B, Palefsky JM. HPV in men: an update. J Low Genit Tract Dis. 2011;15(3):231–234.
11. Ault KA. Epidemiology and Natural History of Human Papillomavirus Infections in the Female Genital Tract. Infect Dis Obstet Gynecol. 2006;2006:40470.
12. Stanley M. Prophylactic HPV vaccines. J Clin Pathol. 2007;60(9):961–965.
13. Wright TC, Bosch FX, Franco EL, et al. HPV vaccines and screening in the prevention of cervical cancer; conclusions from a 2006 workshop of international experts. Vaccine. 2006;24:S251–61.
14. National Cancer Institute. Human Papillomavirus (HPV)

Vaccines. 2016. Available at: https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-vaccine-fact-sheet#q5 [Accessed on 23-12-2016]
15. Chaturvedi AK, Engels EA, Pfeiffer RM, et al. Human papillomavirus and rising oropharyngeal cancer incidence in the United States. J Clin Oncol. 2011;29(32):4294–4301.
16. Gillison ML, Chaturvedi AK, Lowy DR. HPV prophylactic vaccines and the potential prevention of noncervical cancers in both men and women. Cancer. 2008;113(10 Suppl):3036–3046.
17. Koutsky LA, Ault KA, Wheeler CM, et al. Proof of Principle Study Investigators. A controlled trial of a human papillomavirus type 16 vaccine. N Engl J Med. 2002;347(21):1645–1651.
18. National Centre for Immunization Research and Surveillances. Human Papillomavirus (HPV) Vaccines for Australians: Information for Immunization Providers. NCIRS Fact sheet: April 2016. Available at: http://www.ncirs.edu.au/assets/provider_resources/fact-sheets/human-papillomavirus-hpv-fact-sheet.pdf [Accessed on 23-12-2016]
19. National Cancer Institute. Gardasil 9 Vaccine Protects against Additional HPV Types. 2015. Available at: https://www.cancer.gov/types/cervical/research/gardasil9-prevents-more-HPV-types [Accessed on 23-12-2016]
20. The World Health Organization. Comprehensive cervical cancer prevention and control: A healthier future for girls and women. The World Health Organization, Geneva, Switzerland, 2013. Available at: http://www.who.int/immunization/hpv/learn/comprehensive_cervical_cancer_who_2013.pdf [Accessed on 23-12-2016]
21. Liu X, Feng A, Cui Y, et al. Prevention of human papillomavirus (HPV) infection and cervical cancer in China: how does HPV vaccination bring about benefits to Chinese women? Biosci Trends. 2013;7(4):159–167.
22. Al-Naggar RA, Chen R. Practice and Barriers towards Cervical Cancer Screening among University Staff at a Malaysian University. J Community Med Health Educ. 2012;2(1):1000120.
23. Al-Naggar RA, Zaleha MI. Perception and opinion of medical students about Pap smear test: a qualitative study. Asian Pac J Cancer Prev. 2010;11(2):435–440.
24. Al-Naggar RA, Low WY, Zaleha MI. Knowledge and barriers towards cervical cancer screening among young women in Malaysia. Asian Pac J Cancer Prev. 2010;11(4):867–873.
25. Wong YL, Chinna K, Mariapun J, et al. Correlates between risk perceptions of cervical cancer and screening practice. Prev Med. 2013;57(Suppl):S24–26.
26. Fauziah A, Norlaili AA, Su TT. Factors related to poor practice of Pap smear screening among secondary school teachers in Malaysia. Asian Pac J Cancer Prev. 2011;12(5):1347–1352.
27. Asmani AR, Aziah D. Pap smear practice among women in Mukim Jaya Setia, Kelantan. Malay J Public Health Med. 2007;7(1):20–24.
28. Fu CJ, Pan XF, Zhao ZM, et al. Knowledge, perceptions and acceptability of HPV vaccination among medical students in Chongqing, China. Asian Pac J Cancer Prev. 2014;15(15):6187–6193.
29. Zhao FH, Tiggelaar SM, Hu SY, et al. A multi-center survey of HPV knowledge and attitudes toward HPV vaccination among women, government officials, and medical personnel in China. Asian Pac J Cancer Prev. 2012;13(5):2369–78.
30. Ghojazadeh M, Naghavi-Behzad M, Azar ZF, et al. Parental knowledge and attitudes about human papilloma virus in Iran. Asian Pac J Cancer Prev. 2012;13(12):6169–6173.
31. Pan XF, Zhao ZM, Sun J, et al. Acceptability and Correlates of Primary and Secondary Prevention of Cervical Cancer among Medical Students in Southwest China: Implications for Cancer Education. PLoS ONE. 2014;9(10):e110353.
32. Chang IJ, Huang R, He W, et al. Effect of an educational intervention on HPV knowledge and vaccine attitudes among urban employed women and female undergraduate students in China: a cross-sectional study. BMC Public Health. 2013;13:916.
33. Nulty DD. The adequacy of response rates to online and paper surveys: what can be done? Assess Eval High Educ. 2008;33(3):301–314.
34. Response rates. Available at: https://facultyinnovate.utexas.edu/sites/default/files/response_rates.pdf [Accessed on 25-12-2016]
35. Ismail S, Rahman NIA, Mohamad N, et al. Preference of teaching and learning methods in a new medical school of Malaysia. J Appl Pharm Sci. 2014;4(2):48–55.
36. Chen MK, Chevalier JA. Are women overinvesting in education? Evidence from the medical profession. J Hum Cap. 2012;6(2):124–149.
37. BBC [webpage on the Internet]. Women docs "weakening" medicine; 2004. Available from: http://news.bbc.co.uk/1/hi/health/3527184.stm. [Accessed on 25-12-2016]
38. Elston MA. Women and medicine: the future. Royal College of Physicians; 2009. Available from: https://www.rcr.ac.uk/sites/default/fles/RCP_Women_%20in_%20Medicine_%20Report.pdf. [Accessed on 25-

12-2016]
39. Sheikh SA, Simbak NB, Ismail SB, et al. A Pilot Survey of Awareness and Knowledge of Human Papillomavirus (HPV), Cervical Cancer and HPV Vaccine among Men and Women Attending for HPV Vaccination in Terengganu, Malaysia. Int J Pharm Sci Rev Res. 2015;31(2):242–246.
40. Zhang Y, Wang Y, Liu L, et al. Awareness and knowledge about human papillomavirus vaccination and its acceptance in China: a meta-analysis of 58 observational studies. BMC Public Health. 2016;16:216.
41. Ramavath KK, Olyai R. Knowledge and Awareness of HPV Infection and Vaccination Among Urban Adolescents in India: A Cross-Sectional Study. J Obstet Gynaecol India. 2013;63(6):399–404.
42. Pandey D, Vanya V, Bhagat S, et al. Awareness and Attitude towards Human Papillomavirus (HPV) Vaccine among Medical Students in a Premier Medical School in India. PLoS ONE. 2012 Jul 31;7(7):e40619.
43. Hussain AN, Alkhenizan A, McWalter P, et al. Attitudes and perceptions towards HPV vaccination among young women in Saudi Arabia. J Family Community Med. 2016;23(3):145–150.
44. Chiang VCL, Wong HT, Yeung PCA, et al. Attitude, Acceptability and Knowledge of HPV Vaccination among Local University Students in Hong Kong. Int J Environ Res Public Health. 2016;13(5):486.
45. Williams K, Forster A, Marlow L, et al. Attitudes towards human papillomavirus vaccination: a qualitative study of vaccinated and unvaccinated girls aged 17–18 years. J Fam Plan Reprod Health Care. 2011;37:22–25.
46. Walsh CD, Gera A, Shah M, et al. Public knowledge and attitudes towards Human Papilloma Virus (HPV) vaccination. BMC Public Health. 2008;8:368.
47. McCave EL. Influential Factors in HPV Vaccination Uptake Among Providers in Four States. J Community Health. 2010;35(6):645–652.
48. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: A theory-informed, systematic review. Prev Med. 2007;45(2-3):107–114.
49. Keating KM, Brewer NT, Gottlieb SL, et al. Potential Barriers to HPV Vaccine Provision Among Medical Practices in an Area with High Rates of Cervical Cancer. J Adoles Health. 2008;43(4 Suppl):S61–S67.
50. Dempsey AF, Davis MM. Overcoming Barriers to Adherence to HPV Vaccination Recommendations. Am J Manag Care. 2006;12:S484–S491.
51. Markowitz LE, Tsu V, Deeks SL, et al. Human papillomavirus vaccine introduction--the first five years. Vaccine. 2012;30(Suppl 5):F139–148.
52. Knight K, Badamgarav E, Henning JM, et al. A systematic review of diabetes disease management programs. Am J Manage Care. 2005;11(4):242-250.
53. Holman H, Lorig K. Patient self-management: A key to effectiveness and efficiency in care of chronic disease. Public Health Rep. 2004;119:239–243.
54. Kiberenge MW, Ndegwa ZM, Njenga EW, et al. Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. Pan Afr Med J. 2010;7:2.
55. Bansal AB, Pakhare AP, Kapoor N, et al. Knowledge, attitude, and practices related to cervical cancer among adult women: A hospital-based cross-sectional study. J Nat Sci Bio Med. 2015;6(2):324–328.
56. Multani S, Reddy JJ, Bhat N, et al. Assessment of Knowledge, Attitude, Behavior and Interpersonal Factors Related to the Use of Tobacco among Youth of Udaipur City, Rajasthan, India: A Cross-Sectional Study. Addict Health. 2012; 4(3-4):142–150.
57. Swarnapriya K, Kavitha D, Reddy GMM. Knowledge, Attitude and Practices Regarding HPV Vaccination Among Medical and Para Medical in Students, India a Cross Sectional Study. Asian Pac J Can Prev. 2015;16:8473–8477.
58. Hoque ME. Factors influencing the recommendation of the Human Papillomavirus vaccine by South African doctors working in a tertiary hospital. Afr Health Sci. 2016;16(2):567–575.

## ACKNOWLEDGEMENTS

Authors are grateful to those medical and health professionals who, who had participated in the current study in their highly involving working hours. The authors also like to extend their heartfelt thanks to all members of the Universiti Sultan Zainal Abidin Research Ethics Committee.

## PEER REVIEW

Not commissioned. Externally peer reviewed.

## CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

## FUNDING

This study funded by the Centre for Research and Innovation, UniSZA, Malaysia (UniSZA.C/2/PPI/628-1/ (61); Dated: 6-May-2014).

## ETHICS COMMITTEE APPROVAL

The ethical approval certificate was obtained from Medical Research and Ethics Committee, Ministry of Health, Jalan Rumah Sakit, Bangsar, 59000 Kuala Lumpur, Malaysia

(Memo no. (7) KKM/NIHSEC/P15-1317, Dated: 29-October-2015). This study was also approved and funded by the Centre for Research and Innovation, UniSZA, Malaysia (UniSZA.C/2/PPI/628-1/ (61); Dated: 6-May-2014).

## Figures and Tables

**Table 8: Comparison of mean knowledge scores between medical and paramedical staff (n= 609)[a]**

| Variable | Mean (SD) | | Mean difference (95% CI) | *t* statistic (df) | *p*-value* |
|---|---|---|---|---|---|
| | Medical staff (n =286) | Paramedical staff (n =286) | | | |
| Knowledge scores | 13.71 (2.09) | 12.87 (2.43) | 0.84 (0.49, 1.20) | 4.619 (607) | <0.001 |

*Independent t- test, a=20 participants did not answer about their professionals and thus only 609 answer that questions.

**Table 9: Comparison of mean attitude scores between medical and paramedical staff (n= 609)[a]**

| Variable | Mean (SD) | | Mean difference (95% CI) | *t* statistic (df) | *p*-value* |
|---|---|---|---|---|---|
| | Medical staff (n =286) | Paramedical staff (n =286) | | | |
| Attitude scores | 9.55 (1.4) | 9.20 (1.51) | 0.35 (0.12, 0.58) | 2.949 (607) | 0.003 |

*Independent t-test, a=20 participants did not answer about their professionals and thus only 609 answer that questions.

**Figure 5: Barriers to HPV Vaccination among all staff (n =629)**