

# Cervical cancer and pap smear screening: knowledge, attitude and practice among working women in northern state of Malaysia

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## ABSTRACT

**Introduction:** Cervical cancer is among the most common cancers in women worldwide. The Pap smear test is the primary screening procedure used to detect abnormal cells that may develop into cancer.

**Objectives:** This study analysed the knowledge, attitudes and practices of working women in Kedah state, Malaysia, about cervical cancer and Pap smear tests and the associations of knowledge, attitudes and practices with socio-demographic factors.

**Methods:** This cross-sectional questionnaire study analysed knowledge, attitudes and practices among 210 female entrepreneurs who received funding from *Amanah Ikhtiar Malaysia* (AIM) in Kedah state. Women were included if they were married or previously married, aged 20–65 years and had not been diagnosed with cervical cancer.

**Results:** Most subjects could not recall common symptoms of cervical cancer, such as bleeding between periods, and did not know or were unsure of the suitable age for Pap smear tests and the interval between tests. Although most subjects agreed that Pap smear tests were necessary, some gave priority to other issues. About half (55.2%) had undergone Pap smear tests, but only 38.6% had been tested within the previous five years. Use of hormonal contraceptives, higher knowledge score, and higher attitude score were associated with Pap smear testing within the previous 5 years.

**Conclusions:** Knowledge regarding cervical cancer and Pap smear testing and attitudes toward testing were poor among most participants. These factors were significantly associated with lack of actual testing.

## KEY WORDS:

*Cervical cancer, attitude, knowledge, practice, Pap smear, working women, Malaysia*

## INTRODUCTION

Cervical cancer is the fourth most common cancer among women, with an estimated 528,000 new cases diagnosed worldwide, and an estimated 266,000 deaths, in 2012. This

accounted for 7.5% of all cancer deaths among women.<sup>1</sup> Disease burden and mortality rate vary among different regions of the world, with around 85% of cases, and almost 87% of cervical cancer deaths, occurring in less developed regions.<sup>1</sup> Mortality rates vary from as low as below than 2 per 100,000 women in Western Asia, Western Europe and Australia/New Zealand to above 20 per 100,000 in Melanesia and Middle and Eastern Africa.<sup>1</sup> In Malaysia, cervical cancer was the third most common cancer in women, with an incidence rate of 6.5 per 100,000 in 2011<sup>2</sup> and an estimated mortality rate of 4.7 per 100,000 in 2012.<sup>3</sup>

In Malaysia, the Papanicolaou (Pap) smear test is currently the primary screening tool for early detection of cervical cancer.<sup>4</sup> The 2003 Clinical Practice Guidelines of the Ministry of Health Malaysia and the Academy of Medicine of Malaysia recommend that all women aged 20-65 years who are, or have been, sexually active undergo Pap smear screening.<sup>4</sup> Women with negative results are recommended to undergo re-screening every 3-5 years.<sup>5</sup>

Pap smear screening test, first introduced to Malaysia in the 1960s, has been offered for free at all government health facilities since 1995 except health facilities in some universities that impose some charges. Despite these tests being free, only 45.7% of Malaysian women aged ≥20 years have undergone Pap smear testing.<sup>6</sup> Although this percentage has increased from 26.0% in 1996,<sup>7</sup> the screening rate is still below the minimum recommended coverage of 80%.<sup>8</sup> Factors found to be associated with performance of Pap smear testing include age, personal income, marital status, type of contraception method, working commitments, awareness of testing, and perception of barriers to the test.<sup>9-13</sup>

The aim of this study was to determine knowledge about cervical cancer and Pap smear testing amongst working women in Kedah, a state in northern Malaysia. The attitudes of women toward Pap smear testing, performance of the test, and factors associated with the latter were also investigated.

## MATERIALS AND METHOD

### *Study design and population*

This cross-sectional study was conducted in Kedah, a state in Peninsular Malaysia. The Districts of Alor Setar and Sungai

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Petani were chosen due to their similarities in geography, population distribution, and socio-cultural background. The study population consisted of female entrepreneurs who received funding from *Amanah Ikhtiar Malaysia* (AIM), a non-governmental microfinance institution that provides capital financing, savings and healthcare financing assistance to women in Malaysia, with the main objective being to alleviate poverty. The recipients of AIM funding, known as *Sahabat AIM*, represent working women from both urban and rural areas. Women were included if they were married or previously married, aged 20–65 years, and had not been diagnosed with cervical cancer.

Sample size was calculated using the formula to estimate a single proportion with a 95% confidence interval (CI), a precision of 0.07, and an expected proportion of 38%.<sup>14</sup> Anticipating a 15% nonresponse rate, a sample size of 210 was deemed sufficient. A systematic random sampling method was used to select 105 women from each district.

The study design was approved by the Human Research Ethics Committee (JEPeM), Universiti Sains Malaysia, Malaysia (USM/JEPeM/ 16010010), and permission was also sought from the AIM.

#### Research tools

Cervical cancer and its relationship to Pap smear tests were evaluated using a previously validated questionnaire developed in Bahasa Malaysia.<sup>15</sup> The questionnaire included 18 items that assessed knowledge cervical cancer, including its symptoms (four items), risk factors (10 items) and possible treatments (four items). The questionnaire also included 11 items assessing knowledge of Pap smear screening tests, including its purpose (three items) and procedures (two items), women recommended to undergo screening (three items), and optimal times for screening (three items). Each knowledge question had three possible responses: true, false and unsure, with correct responses scored as one point each, and all other responses as zero points. Possible responses on recommended intervals between Pap smear tests included annually, once every 1-3 years, once every five years, once every 10 years, and once per lifetime.

The attitude of subjects toward Pap smear tests was evaluated using a second questionnaire developed in Bahasa Malaysia.<sup>9</sup> The questionnaire included 17 items that assessed attitudes regarding perceived barriers to Pap smear tests, with responses scored using a 5-point Likert scale, with 5, 4, 3, 2, and 1 indicating strongly disagree, disagree, not sure, agree, and strongly agree, respectively. The questionnaire also included a section on subjects' socio-demographic characteristics, such as age, ethnicity, highest level of education, personal monthly income, and marital status; reproductive history, including menopausal stage and method of contraception; and Pap smear practices.

#### Data collection

All *Sahabat AIM* were required to attend a weekly meeting, held at a public place such as a community centre. Subjects were recruited at these meetings by the main researcher. Following establishment of study eligibility, all potential participants were informed of the importance, objectives, procedures, and other essential information regarding this

study. Written informed consent was obtained from women who agreed to participate. Further instructions on the questionnaires were provided, and the participants were asked to complete the questionnaires. All questionnaires were self-administered, and collected immediately upon completion.

#### Statistical analysis

Data was analysed using IBM SPSS Statistics software version 22.0. Variables were reported as frequency and percentage or as mean  $\pm$  standard deviation. The scores for all 30 knowledge items and the 17 attitude items were summed up to obtain overall scores. Total knowledge scores ranged from 0 to 30, with higher scores indicating greater knowledge, whereas total attitude scores ranged from 17 to 85, with higher scores indicating better attitudes. Factors associated with the performance of Pap smear tests within the past five years were determined at both the univariable and multivariable levels using simple logistic regression analysis and multiple logistic regression analysis, respectively. Independent variables tested included age group, education level, personal monthly income, marital status, menopausal stage, type of contraception method, knowledge score, and attitude score.

Any variable with a *P* value less than 0.25 in the univariate analysis or reported to be influential in previous studies was entered into the multivariate analysis.<sup>16</sup> Variables included in the multiple logistic regression analysis model were selected using forward and backward likelihood ratio (LR) tests. Following variable selection, the fit of the preliminary model and the importance of each selected variable were verified. All interaction terms were checked. The final model was assessed for fitness using the Hosmer-Lemeshow goodness-of-fit test. The overall correct classification result and the area under the receiver operating characteristic (ROC) curve were also calculated to evaluate model fitness.

## RESULTS

Table I shows the sociodemographic of the study participants. Their mean (SD) age was 43 (10.29) years, most were Malay (98.6%) and most had at least a secondary school education (77.2%). Personal monthly income for most participants (97.2%) was less than 3000 Malaysian ringgit (MYR). About one-third of the participants were using contraception (31.4%), with hormonal methods being the most common. Some participants (21.9%) were postmenopausal.

Table II shows the responses of the participants to questionnaires regarding their knowledge of cervical cancer and Pap smear. Fewer than half of the participants knew that an unpleasant discharge (41.4%), abnormal bleeding between periods (48.6%) and discomfort or pain during sex (41.9%) were symptoms of cervical cancer. Similar percentages of subjects knew that having many sexual partners (49%) and human immunodeficiency virus (HIV) infection (41.0%) could increase the risk of cervical cancer. Also, fewer participants knew that human papilloma virus (HPV) infection (31.4%), smoking (35.2%) and starting to have sexual intercourse at a young age (25.2%) were risk factors for cervical cancer.

Although 91.0% of participants knew that the purpose of Pap smear screening was to detect cervical cancer, 90.0% incorrectly believed that Pap smear screening can detect other sexually transmitted diseases. Most participants knew that Pap smear is recommended for women who have had sexual intercourse (83.3%) and knew about the procedures involved in Pap smear testing (89.5%), although 38.6% thought that Pap smear testing was a surgical procedure.

Table III shows the attitudes of the participants regarding Pap smear testing. Most participants did not know or were unsure about the suitable age for Pap smear testing (68.6%) and the interval between tests (73.4%), and 32.0% did not know or were unsure about where to go for testing. Almost half the participants lacked information and awareness regarding cervical cancer (46.7%) and Pap smear screening tests (45.7%), and about one-third reported not receiving sufficient information about cervical cancer (36.7%) and Pap smear screening tests (34.2%) from healthcare personnel. Nevertheless, more than half of the participants disagreed that Pap smear screening was very strange to them (61.4%), painful (61.4%), and costly (65.7%). Although more than two-thirds (68.1%) disagreed that Pap smear tests were not necessary, some (44.3%) prioritised other, more important things.

Subjects had a mean (SD) knowledge score of 12.83 (5.55), with minimum and maximum scores of 0 and 25, respectively; and a mean (SD) attitude score of 55.83 (9.39), with minimum and maximum scores of 33 and 81, respectively. About half the participants (55.2%) reported undergoing Pap smear testing, but only 38.6% underwent screening within the previous five years. Table IV shows the results of simple logistic regression analysis of the relationship between the tested variables and undergoing Pap smear testing within the previous five years. Univariate analysis showed that factors associated with Pap smear testing at the recommended interval were contraception method, knowledge score, and attitude score.

Multivariable logistic regression analysis showed that factors independently associated with Pap smear testing at the recommended interval among the study subjects were method of contraception, knowledge score, and attitude score (Table V). In particular, participants who used hormonal contraception methods were more likely to have undergone Pap smear testing within the previous five years than subjects who were not using any method of contraception (OR 3.97, 95% CI: 1.95-8.07). In addition, 1-unit increases in both knowledge score (OR 1.09, 95% CI: 1.04-1.15) and attitude score (OR 1.06, 95% CI: 1.03-1.09) were associated with an increased likelihood of having undergone Pap smear testing within the previous 5 years. Results of the Hosmer-Lemeshow model fitness test were not significant ( $p=0.547$ ) and the area under the ROC curve was 0.731, suggesting that the model was fit. The overall correct classification result indicated that 69.5% of the participants were correctly classified as to whether or not they had undergone Pap smear testing within the previous 5 years.

**Table I: Sociodemographic characteristics of study participants**

Variable	Frequency (%)
Age group (years)	
20 - 34	54 (25.7)
35 - 49	89 (42.4)
50 - 65	67 (31.9)
Ethnic group	
Malay	207 (98.6)
Indian	1 (0.5)
Others	2 (1.0)
Highest educational level	
No formal qualification	4 (1.9)
Primary school	23 (11.0)
Lower secondary school	51 (24.3)
Upper secondary school	111 (52.9)
Certificate	6 (2.9)
Diploma/Vocational	14 (6.7)
Bachelor/Masters/PhD	1 (0.5)
Personal monthly income (MYR)	
≤ 1000	94 (44.8)
1001 - 3000	110 (52.4)
≥ 3001	6 (2.9)
Marital status	
Married	179 (85.2)
Separated	3 (1.4)
Divorced	10 (4.8)
Widowed	18 (8.6)
Menopausal stage	
Yes	46 (21.9)
No	164 (78.1)
Contraception method	
None	144 (68.6)
Hormonal (pill/injection)	51 (24.3)
Intrauterine device	5 (2.4)
Condom	5 (2.4)
Others	5 (2.4)

## DISCUSSION

In this study, the majority of participants were Malays who had at least a secondary school education with had an income of less than MYR3000 per month. Nevertheless, more than half (55.2%) of these subjects had undergone Pap smear screening. This percentage was higher than the 39.7% of women reported in a National Survey performed in 2006,<sup>6</sup> although it was still below the recommended coverage of 80%.<sup>8</sup> A study of secondary school teachers in Malaysia, with a higher level of education and a higher income level than in our subjects, found that only 38% had ever undergone Pap smear testing.<sup>9</sup> This low percentage may have been due to the characteristics of the study sample, as most of the participants were young, newly married, at an early stage of forming a family and in new working environment. Subjects with a higher educational level and higher income were more likely to perceive their commitment to work as a barrier to Pap smear testing.<sup>9,17</sup> A study performed in a rural area of Malaysia also found that higher educational level and higher income were not significantly associated with Pap smear screening.<sup>14</sup>

As almost all of our subjects were Malays, our sample was not representative of the population of Malaysia. Most Malays, especially those in lower socioeconomic groups, seek medical treatment from government clinics, despite long waiting times and large crowds. In contrast, non-Malays living in urban areas are more likely to go to private clinics for Pap

Table II: Knowledge of participants regarding cervical cancer and Pap smear screening

Variable	Frequency (%)	
	Correct response	Incorrect response/ Unsure
Symptoms of cervical cancer		
Vaginal discharge	39 (18.6)	171 (81.4)
Smelly vaginal discharge	87 (41.4)	123 (58.6)
Abnormal vaginal bleeding between periods	102 (48.6)	108 (51.4)
Discomfort or pain during sex	88 (41.9)	122 (58.1)
Factors increasing the risk for cervical cancer		
Family history of cervical cancer	93 (44.3)	117 (55.7)
Consumption of high fat diet	39 (18.6)	171 (81.4)
Multiple sexual partners	103 (49.0)	107 (51.0)
Smoking	74 (35.2)	136 (64.8)
HIV infection	86 (41.0)	124 (59.0)
HPV infection	66 (31.4)	144 (68.6)
Never been pregnant	54 (25.7)	156 (74.3)
Cancers affecting other reproductive organs	17 (8.1)	193 (91.9)
Start having sex as teens	53 (25.2)	157 (74.8)
Miscarriage	42 (22.9)	162 (77.1)
Treatments for cervical cancer		
Chemotherapy	117 (55.7)	93 (44.3)
Radiotherapy	54 (25.7)	156 (74.3)
Surgical removal	117 (55.7)	93 (44.3)
Traditional medicine	42 (20.0)	168 (80.0)
Purpose of Pap smear		
Early detection of cervical cancer	191 (91.0)	19 (9.0)
Detection of sexually transmitted disease	21 (10.0)	189 (90.0)
Detection of HIV/AIDS	58 (27.6)	152 (72.4)
Pap smear test procedure		
Surgical	129 (61.4)	81 (38.6)
Use of an instrument to collect cervical cells via the vagina	188 (89.5)	22 (10.5)
Women recommended for Pap smear screening		
Women who have experienced sexual intercourse	175 (83.3)	35 (16.7)
Postmenopausal women	113 (53.8)	97 (46.2)
Married women who were never pregnant	96 (45.7)	114 (54.3)
Optimal time for Pap smear screening		
During menstruation	131 (62.4)	79 (37.6)
One day after menstruation	99 (47.1)	111 (52.9)
10 days after menstruation	153 (72.9)	57 (27.1)
Recommended interval of Pap smear testing		
Annually	128 (61.0)	
Every 1–3 years	62 (29.5)	
Every 5 years	13 (6.2)	
Every 10 years	2 (1.0)	
Once in a lifetime	5 (2.4)	

smear tests at convenient times, thereby avoiding government clinics.<sup>17</sup> Non-Malays are therefore more likely than Malays to perceive cost as a barrier to testing.<sup>9</sup> In contrast, a study in a rural area found that the Chinese women were less likely to be tested than Malay women<sup>14</sup>, perhaps because most the Chinese women who remained in rural areas were elderly.

In general, most participants in this study had limited knowledge regarding cervical cancer and Pap smear screening. More than half did not know that an unpleasant discharge, abnormal bleeding between periods and pain during sex were symptoms of cervical cancer. They also thought that Pap smear screening could detect other sexual transmitted diseases. Similar findings were reported in previous studies.<sup>11,13,18</sup> Because women who lack knowledge about the symptoms of cervical cancer will likely be unaware of the necessity of periodic Pap smear testing, they are likely to present initially with advanced stage disease.<sup>13</sup>

More than half of the subjects in the present study were unaware that HPV infection (66.9%), smoking (62.3%) and sexual intercourse at a young age (74.6%) were factors associated with increased risk of cervical cancer. This finding, (that relatively few women knew that HPV infection was a risk factor for cervical cancer), suggests that large numbers of sexually active women who acquire the infection through sexual activities might be unaware of its source.<sup>13</sup> Both HPV and cervical cancer have been linked to sexual habits.<sup>19,20</sup> For example, being sexually active, having multiple partners and having sex at a young age could predispose to cervical cancer.<sup>13</sup> A study in Ghana reported that only small percentage of subjects were aware that sexual activity was a risk factor for cervical cancer,<sup>13</sup> whereas 69.7% of women in Estonia were aware of this link. However, fewer than half the participants in Estonia were aware of the impact of smoking on cervical cancer.<sup>22</sup> It is imperative for women to know the factors predisposing to cervical cancer, as lack of knowledge of these risk factors can affect the number who undergo Pap smear testing.<sup>22,23</sup>

**Table III: Attitude of participants regarding Pap smear screening**

Variable	Frequency (%)				
	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
I feel shy, embarrassed and reluctant during the Pap smear test examination	38 (18.1)	61 (29.0)	29 (13.8)	73 (34.8)	9(4.3)
Pap smear test is very strange for me	32 (15.2)	97 (46.2)	39 (18.6)	36 (17.1)	6 (2.9)
The process of Pap smear examination is painful	34 (16.2)	95 (45.2)	67 (31.9)	11 (5.2)	3 (1.4)
I'm afraid the results may show that I am positive for cancer	10 (4.8)	55 (26.2)	49 (23.3)	83 (39.5)	13 (6.2)
I don't know the suitable age for a Pap smear examination	21 (10.0)	45 (21.4)	88 (41.9)	50 (23.8)	6 (2.9)
I lack information and awareness about cervical cancer	14 (6.7)	36 (17.1)	62 (29.5)	90 (42.9)	8 (3.8)
I lack of information and awareness about Pap smear screening tests	14 (6.7)	46 (21.9)	54 (25.7)	83 (39.5)	13 (6.2)
Insufficient information given by health care personnel on cervical cancer	14 (6.7)	45 (21.4)	74 (35.2)	71 (33.8)	6 (2.9)
Insufficient information given by health care personnel on Pap smear test	11 (5.2)	51 (24.3)	76 (36.2)	61 (29.0)	11 (5.2)
I don't know the interval between Pap smear screening tests	14 (6.7)	42 (20.0)	84 (40.0)	64 (30.5)	6 (2.9)
The Pap smear examination process will take a long time	31 (14.8)	95 (45.2)	72 (34.3)	11 (5.2)	1 (0.5)
I give priority to more important things than Pap smear screening tests	29 (13.8)	64 (30.5)	83 (39.5)	29 (13.8)	5 (2.4)
It is unnecessary to go only for a Pap smear	46 (21.9)	97 (46.2)	42 (20.0)	14 (6.7)	11 (5.2)
The cost of the Pap smear test is too high for me	47 (22.4)	91 (43.3)	58 (27.6)	10 (4.8)	4 (1.9)
I do not know where to go for a Pap smear test	46 (21.9)	97 (46.2)	44 (21.0)	22 (10.5)	1 (0.5)
I have never received Pap smear test results	29 (13.8)	79 (37.6)	51 (24.3)	45 (21.4)	6 (2.9)
I have difficulty talking to health care personnel about Pap screening	21 (10.0)	61 (29.0)	63 (30.0)	56 (26.7)	9 (4.3)

**Table IV: Factors associated with Pap smear testing at recommended intervals by simple logistic regression analysis**

Variable	Crude OR	95% CI	LR $\chi^2$ (df) <sup>a</sup>	P-value <sup>a</sup>
Age group (years)			2.26 (2)	0.323
20 - 34	1			
35 - 49	1.08	(0.55, 2.15)	0.05 (1) <sup>b</sup>	0.818 <sup>b</sup>
50 - 65	0.66	(0.31, 1.40)	1.15 (1) <sup>b</sup>	0.284 <sup>b</sup>
Highest educational level			2.70 (2)	0.259
None/primary	1			
Secondary	2.02	(0.81, 5.03)	2.25 (1) <sup>b</sup>	0.134 <sup>b</sup>
Post-secondary/tertiary	1.43	(0.41, 4.99)	0.31 (1) <sup>b</sup>	0.576 <sup>b</sup>
Personal monthly income (MYR)	1.00	(0.99, 1.00)	1.23 (1)	0.268
Marital status				
Separated/divorced/widowed	1			
Married	1.65	(0.72, 3.78)	1.14 (1)	0.230
Menopausal stage				
Yes	1			
No	1.58	(0.78, 3.18)	1.69 (1)	0.194
Contraception method			22.94 (2)	<0.001
None	1			
Hormonal	4.77	(2.41, 9.41)	20.24 (1) <sup>b</sup>	<0.001 <sup>b</sup>
Others	2.97	(1.01, 8.73)	3.92 (1) <sup>b</sup>	0.048 <sup>b</sup>
Knowledge score	1.09	(1.03, 1.15)	10.78 (1)	0.001
Attitude score	1.06	(1.03, 1.15)	13.18 (1)	<0.001

<sup>a</sup> Likelihood Ratio (LR) test

<sup>b</sup>Wald test

**Table V: Factors associated with Pap smear testing at recommended intervals by multiple logistic regression analysis**

Variables	Adjusted OR	95% CI	LR $\chi^2$ (df) <sup>a</sup>	p-value <sup>a</sup>
Contraception method			35.91(4)	<0.001
None	1			
Hormonal	3.97	(1.95, 8.07)	14.53 (2) <sup>b</sup>	<0.001 <sup>b</sup>
Others	2.64	(0.88, 7.96)	2.98 (1) <sup>b</sup>	0.084 <sup>b</sup>
Knowledge score	1.09	(1.04, 1.15)	10.78 (1)	0.001
Attitude score	1.06	(1.03, 1.09)	13.18 (1)	<0.001

<sup>a</sup> Likelihood ratio (LR) test

<sup>b</sup>Wald test

Two-thirds of our subjects reported that the information they received from healthcare personnel on cervical cancer and Pap smear testing was insufficient. Poor dissemination of accurate information on cervical cancer and Pap smear screening contributed to the lack of testing and irregular screening habits. Sources of information also play a role in imparting effective knowledge. For example, the use of mass media, health campaigns and health talks may be useful in disseminating knowledge about Pap smears and cervical cancer.<sup>13</sup> Surprisingly, a study among nursing staff in India found that 79.5% had never undergone cervical cancer screening and 87.5% did not recommend it to others.<sup>24</sup> As healthcare providers are supposed to be role models and the main promoters of healthcare services, those who do not understand the need for Pap smear screening will not recommend. Improving the knowledge, attitudes and practices among health workers can enable them to promote these tests to their patients.<sup>18</sup>

Altering an individual's health behaviour is difficult, as many underlying health determinants are influenced by attitude. In agreement with other studies in Malaysia,<sup>25,26</sup> our subjects claimed that embarrassment and fear of results positive for cancer were contributing factors for not undergoing Pap smear screening. Almost all (98.8%) where the subjects in our study were Malay Muslims, an ethnic group that are more reserved, where wives require spousal consent, and women feeling shy, embarrassed and reluctant during Pap smear tests.

Culture and tradition, including strong religious beliefs, can also contribute to negative attitudes towards Pap smear screening.<sup>27</sup> Socio-cultural issues, such as a female sample collector and the positive attitude of medical staff, are also important, as gynaecological examination is regarded as a taboo in some societies.<sup>28,29</sup> Women generally prefer that Pap smear samples be taken by a gynaecologist or midwife rather than a general practitioner<sup>21</sup> and prefer females to male sample collectors.<sup>30</sup> The later was not a problem in our study, as most of the sample collectors in governmental health facilities in the district of Alor Setar and Sg. Petani were females. Similar to women in Qatar<sup>30</sup> and Singapore,<sup>31</sup> women in our study were reluctant to undergo testing due to their fear of pain and their regarding testing as a complicated procedure.

An individual's knowledge and attitudes about the causes and risk factors of a particular illness are interconnected with their practice. In our study, only 81 (38.6%) of 210 women had undergone Pap smear testing within the past five years, although about half (55.2%) claimed to have undergone testing at least once before. Many (68.6%) were not sure of the suitable age and interval between tests. Although many agreed that Pap smear testing was necessary, 44.3% regarded these tests as less important than other issues, perhaps because they did not deem preventive health check-ups as important, especially without any disease symptoms.<sup>32</sup> The cost of transport and time spent away from work were additional factors that contributed to the low percentage of our subjects who underwent testing, despite the cost of Pap smears may be subsidised by the government of Malaysia. Factors contributing to a lack of testing in countries in which screening is costly include long waiting lists, the distance to testing facilities, and financial barriers.<sup>13,21</sup>

We also observed that Pap smear testing was associated with marital status, menopausal stage, contraception method, attitude score and knowledge score. In particular, women who used hormonal methods of contraception were almost four times more likely to have undergone Pap smear testing within the previous five years than subjects who were not using any method of contraception. Additionally, subjects with higher knowledge and attitude scores were more likely to have undergone testing within the previous five years. These results support the establishment of opportunistic screening programmes, testing women during their antenatal check-up and family planning consultations. Our findings are consistent with those of other studies, which reported that women of reproductive age were more likely to be screened than women who were post-menopausal, unmarried, married with no children, and not using any method of contraception.<sup>9,10,12</sup> Women in the later categories are less likely to go to a health clinic for gynaecological check-ups and this could be the possible reasons for not undergoing Pap smear testing. In contrast, although post-menopausal women may have acquired knowledge during their visits to antenatal clinics at a younger age, their awareness and knowledge may have lessened as their visits to an antenatal clinic became less frequent and were no longer necessary. This situation is of concern, as women aged 50-65 years are at highest risk of cervical cancer and the mortality rate from this disease peaks at age 60-69 years.<sup>33,34</sup> Moreover, the reduction in screening observed amongst post-menopausal women suggests that previous Pap smear tests were due to persuasion by medical staff, not to an awareness of its importance.<sup>29</sup> In addition, Pap smear testing was due to the perceived risk of cervical cancer,<sup>13</sup> suggesting that women who fail to access health facilities may no longer be screened.

## CONCLUSION

In conclusion, this study showed that a low percentage of working women in a state in Northern Malaysia undergo Pap smear tests, despite a positive attitude towards screening. Current knowledge of women regarding cervical cancer and Pap smear screening is still unsatisfactory. Factors associated with increased performance of Pap smears included taking hormonal contraception and higher knowledge and attitude scores.

Despite the availability of much information about cervical cancer in Malaysia, that should detect and prevent the disease, the prevalence and mortality rates are high.<sup>33</sup> Because greater knowledge can contribute to better awareness, making innovative health education modules available to the public outside health centres can educate the public and improve the percentage of Malaysian women undergoing Pap smear testing.

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