ORIGINAL ARTICLE

THE HEALTH BELIEFS AND PRACTICE AMONG AN INSTITUTE'S FEMALE STAFF POPULATION REGARDING PAP-SMEAR, BREAST SELF-EXAMINATION AND MAMMOGRAPHY SCREENING

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ABSTRACT

Cancer screening is an important part of any cancer control program and the success of any screening program is partly dependent on having large numbers of the high risk population availing themselves of the service. The purpose of this study was to assess the cancer screening behavior of full-time employed women staff of an institute of higher learning using the Health Belief Model (HBM) construct. The results showed that the rate of reported regular cancer screening behavior (Pap smear screening, breast self examination (BSE), clinical breast examination (CBE) and mammography screening) were low. The rates for regular screening were 42.5% (Pap smear), 20.9% (BSE), 15.5% (CBE) and 9.4% (mammography). There were differences in the dimensions of the HBM between the women who reported regular screening and those that did not. The "perceived barriers", "perceived benefits" and "motivation" dimensions were different in Pap smear screening, whereas the "confidence" dimension was different in BSE. Recommendations were made for a health education program targeting both women and men to increase uptake of cancer screening services by women.

Key words: Health Belief Model, Breast Cancer, Cancer of the cervix, Screening behaviour

INTRODUCTION

Breast and cervical cancers are the two leading cancers affecting women in Penang, Malaysia[1]. There are established screening services for both these cancers and in the case of cancer of the cervix, the mortality rates have decreased partly as a result of earlier diagnosis. The Papanicolaou test - also known as the Pap smear, Pap test or cervical smear test, is the screening examination done as an outpatient procedure to detect pre-malignant or malignant changes of the cervix. Many countries have embarked on cervical cancer screening programmes whereby eligible women are educated on the need for regular Pap smear examinations and facilities are provided for women to undergo the test. The recommended screening interval in Malaysia is three years following two initial consecutive negative smears one year apart[2]. Pap smear examinations have been offered for all eligible staff and students of the institute but the rate of uptake was low (Personal communication from Medical Officer in charge of Pap smear service).

In the case of breast cancer, there are a number of strategies to detect early breast cancer disease. A woman may be trained to conduct a monthly breast-self-examination (BSE) as well as undergoing an annual clinical breast examination (CBE) by a trained healthcare staff and regular radiological screening (mammography). At present in Malaysia there is no nationwide mammography screening service but in Penang (where the study was conducted), mammography services are available for a fee. As breast cancer is the leading cancer afflicting women in Penang, the researchers

were also interested in finding out whether the women staff were performing BSE regularly and, for those over 40 years of age, were getting mammography screening. It was decided to use a modified version of the Champion's Health Belief Model (HBM) to assess the factors that may contribute to the screening behaviour[3,4].

Figure 1 illustrates the conceptual model of Champion's HBM which is based on a number of core assumptions. It is assumed that a person will take a health-related action (in this case a cancer screening activity) if that person
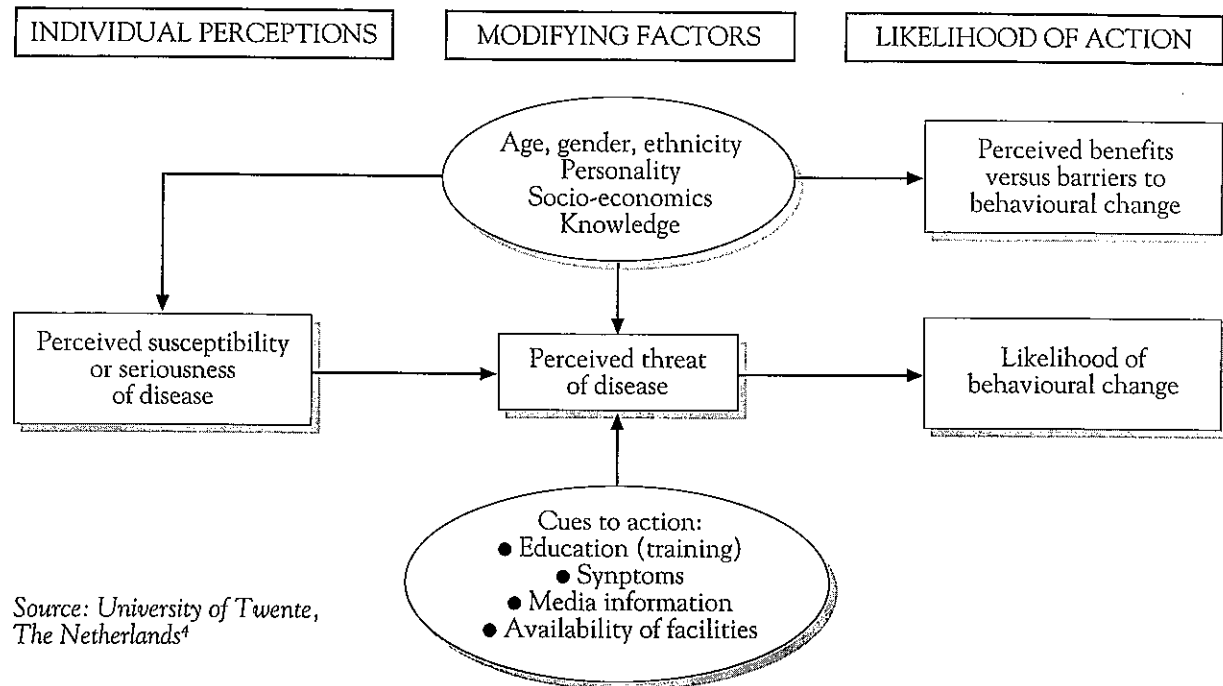a) Feels that a negative health condition (cancer) can be avoided
b) Has a positive expectation that by taking the recommended action, she will avoid a negative health condition (cancer)
c) Believes she is capable of taking the recommended action

The HBM has been applied to a broad range of health behaviours and have formed the basis of a number of health promoting activities[5].

For this study, the HBM has been used to identify the dimensions or constructs that are measured by the questionnaire that are different between the subjects who report regular screening activity and the subjects who do not undergo regular screening. The objectives of this study were to
(1) assess the rate of regular pap smear screening, BSE, clinical breast examination and mammography

Fig 1. Conceptual Model: Health Belief Model

| INDIVIDUAL PERCEPTIONS | MODIFYING FACTORS | LIKELIHOOD OF ACTION |

Age, gender, ethnicity
Personality
Socio-economics
Knowledge

Perceived benefits
versus barriers to
behavioural change

Perceived susceptibility
or seriousness
of disease

Perceived threat
of disease

Likelihood of
behavioural change

Cues to action:
● Education (training)
● Symptoms
● Media information
● Availability of facilities

*Source: University of Twente,
The Netherlands*[4]

screening behavior among eligible full time female staff of the institute

(2) identify the factors associated with regular pap smear screening and

(3) using the HBM construct, identify the dimensions associated with regular screening behavior

METHODOLOGY

The study population comprised of all full-time women staff of the institute from various job categories ranging from academics to support staff who were mainly clerical staff. Pregnant and breast-feeding women were excluded. Anonymity of the respondents was preserved to encourage as truthful a response as possible.

Permission was obtained to use the HBM Questionnaire in an adapted form[2]. The questionnaire included questions on socio-demographic characteristics (such as age, level of education, ethnic origin, religion, type of work at the institute, current marital status); certain cancer risk factors (such as family history of cancer, menstrual history, number of children) and history of cancer screening behavior (such as frequency of BSE examination, clinical breast examination, mammography screening and frequency of Pap smear examination).

The adapted HBM questionnaire was translated and back-translated. It was then pilot-tested on 43 secondary school teachers to assess whether the questions were comprehensible and whether the individual factors in the various dimensions/constructs were valid. Factors with Cronbach-alpha scores that were higher than 0.7 were included in the final questionnaire. The questionnaires were hand delivered and a short explanation of the study was given to the women staff that was present. Completed questionnaires were returned using the pre-addressed envelopes provided.

Data was analyzed using SPSS ver. 12. Descriptive statistics were used for describing the respondents' socio-demographic characteristics. In the analyses of the percentage of respondents reporting cancer screening activities, only the respondents that were eligible for the particular screening activity were used. As such only respondents aged 40 years and above were analyzed for mammography screening activity. Analyses on Pap smear screening were limited to married and ever-married women. The Chi-squared statistic or Fisher Exact Probability Test and the Student's t-test were used to identify factors associated with regular screening behavior (for Pap smear examinations, BSE and mammography) and to compare the various dimensions/ constructs with performance of cancer screening behavior. Levene's test was used to assess equality of variances and the statistical significance was set at $p \leq 0.05$.

Ethical Approval was obtained from the Research & Ethics Committee (FWA Reg No: 00007718; IRB Reg No: 00004494).

RESULTS

A total of 1148 questionnaires were distributed to the various departments. 65 questionnaires were returned unused and a total of 423 questionnaires were returned answered. Of the returned answered questionnaires, only 411 had answers in all the sections. Twelve questionnaires could not be included as either the respondents did not fill up important demographic details or whole sections of the questionnaire had missing data. The response rate in this study was 39.4%.

Table 1. Demographic characteristics of respondents

Characteristics	Number (%) N=411
a) Age – group (Years)	
≤ 25	54 (13.1)
26-35	149 (36.3)
36-45	120 (29.2)
46-55	85 (20.7)
> 55	3 (0.7)
b) Ethnic Group	
Malay	362 (88.1)
Chinese	29 (7.1)
Indian	17 (4.1)
Others	3 (0.7)
c) Religion	
Islam	368 (89.5)
Buddhism	18 (4.4)
Hindu	11 (2.7)
Christian	10 (2.4)
Others	4 (1.0)
d) Education level	
Primary	1 (0.2)
Secondary	148 (36.0)
Diploma/Certificate	133 (32.4)
University	129 (31.5)
e) Marital status	
Never married	105 (25.5)
Married	290 (70.6)
Divorced/Widowed	16 (3.9)

Table 1 shows the distribution of the 411 respondents by age, ethnic group, religion, education level and marital status. The mean age of the respondents was 36.52 years (SD = 9.55) with age range between 20 and 56 years. The majority was Malay (88.1%) and Muslim (89.5%) women. Most had either secondary or diploma/certificate level of education (78.4%) and were married (70.6%).

Figure 2 illustrates the percentage of women reporting regular screening activities for cervical cancer (regular Pap smear examinations 1-3 years apart) and breast cancer (monthly breast self-examination (BSE), annual clinical breast examination (CBE) or regular mammography). For the BSE and CBE, all the women were considered eligible for the screening activity and it was found that only 20.9% reported practicing regular BSE and even less (15.5%) reported having had CBE conducted on them regularly. The percentage of women aged over 40 years reporting regular mammography screening was only 9.4%. The percentage of married/ever-married women reporting regular Pap smear examination was 42.5%.

When analyzing the factors that were associated with regular Pap smear screening, only age-group and having children were found to be significant (Table 2). Education level, age of first menses, ethnic origin and religion were not significantly associated with regular Pap smear screening behavior.

Comparison of the dimensions or constructs of the HBM between the respondents reporting regular screening behavior and those reporting irregular or absent screening

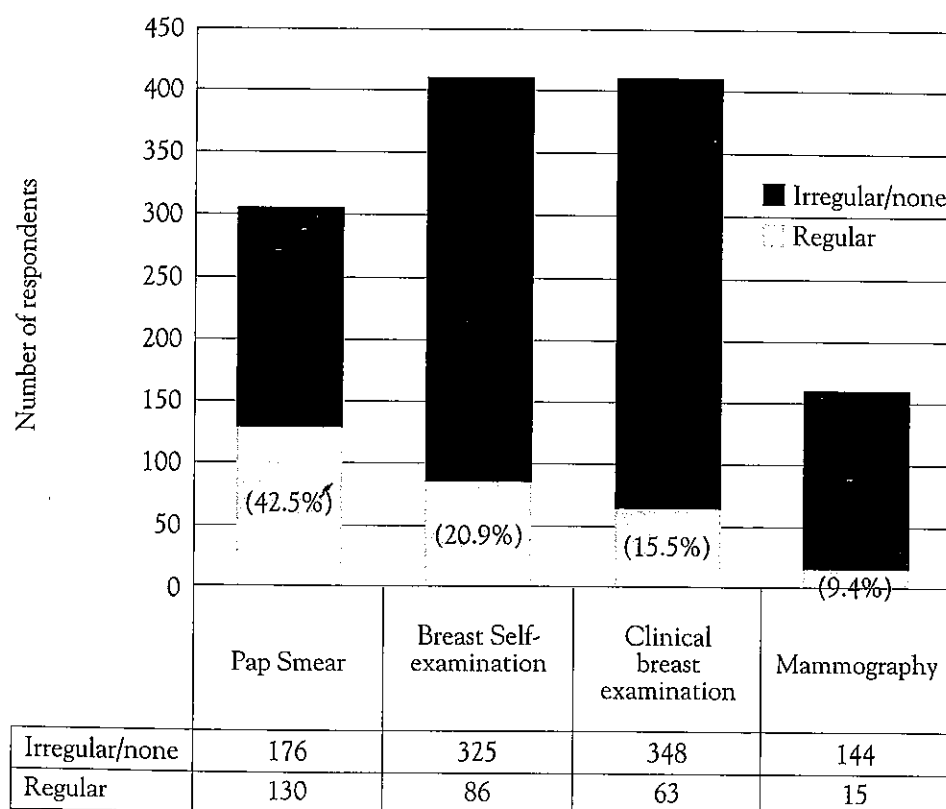Fig 2. Number of respondents reporting cancer screening activities

	Pap Smear	Breast Self-examination	Clinical breast examination	Mammography
Irregular/none	176	325	348	144
Regular	130	86	63	15

Table 2. Factors associated with regular pap smear screening among married/ever married respondents

Variable	n	Regular PAP smear[a] Frequency (%)	Never or irregular[b] PAP smear Frequency (%)	χ^2 (df)[c]	P-value
a) Age-group (yrs)					
Less than 35	117	29 (22.31)	88 (50.00)		
36-45	110	56 (43.08)	54 (30.68)	24.97 (2)	<0.001
46 and above	79	45 (34.61)	34 (19.32)		
b) Education level					
Primary/secondary schooling	122	53 (40.77)	69 (39.21)		
Certificate/Diploma	94	36 (27.69)	58 (32.95)		
Bachelor degree	33	13 (10.00)	20 (11.36)	3.64 (4)	0.45
Master degree	19	7 (5.39)	12 (6.82)		
PhD	38	21 (16.15)	17 (9.66)		
c) Ever had children					
Yes	253	118 (90.77)	135 (76.70)	10.33 (1)	<0.01
No	53	12 (9.23)	41 (23.30)		

a: reporting having a regular PAP smear examination annually or every 2-3 years

b: reporting never undergoing PAP smear or irregular examination

c: Chi-squared statistic (degrees of freedom)

Table 3. Dimensions associated with screening behaviour (regular Pap smear examinations)

Dimension	Regular Screening (n=130) Mean (SD)	Irregular/no screening (n=176) Mean (SD)	Mean difference (95% CI)	t-statistic (df)	P-value
Susceptibility	8.45 (2.09)	8.56 (1.99)	-0.116 (-0.579,0.347)	-0.494 (304)	0.621
Benefit	13.34 (2.01)	12.53 (2.54)	0.811 (0.298,1.323)	3.113[a] (303)	0.002
Barrier	13.30 (4.77)	15.75 (4.60)	-2.450 (-3.513,-1.388)	-4.537 (304)	<0.001
Motivation	28.90 (4.06)	27.36 (4.11)	1.537 (0.607,2.468)	3.253 (304)	0.001

[a] Population variances were significantly different (Levene's test P-value = 0.018), therefore t-test statistic without assuming equal variance was used.

Table 4. Dimensions associated with screening behaviour (monthly Breast Self examination)

Dimension	Regular Screening (n=130) Mean (SD)	Irregular/no screening (n=176) Mean (SD)	Mean difference (95% CI)	t-statistic (df)	P-value
Susceptibility	10.21 (4.44)	10.13 (4.22)	0.088 (-929,1.105)	0.170 (409)	0.865
Seriousness	25.49 (6.54)	25.64 (5.78)	-0.145 (-1.562,1.272)	-0.201 (409)	0.841
Benefit	23.00 (5.33)	21.75 (5.23)	1.247 (-0.004,2.498)	1.960 (409)	0.051
Barrier	12.05 (4.85)	13.29 (5.04)	-1.240 (-2.433,-0.48)	-2.046 (409)	0.041
Confidence	37.10 (8.90)	31.57 (7.90)	5.525 (3.437,7.614)	5.237[a] (123)	<0.001
Motivation	28.81 (3.73)	27.60 (4.02)	1.210 (0.266,2.154)	2.632[b] (142)	0.009

[a] Population variances were significantly different (Levene's test P-value = 0.047), therefore t-test statistic without assuming equal variance was used.

[b] Population variances were significantly different (Levene's test P-value = 0.039), therefore t-test statistic without assuming equal variance was used.

Table 5. Dimensions associated with screening behaviour (regular mammograms)

Dimension	Regular Screening (n=130) Mean (SD)	Irregular/no screening (n=176) Mean (SD)	Mean difference (95% CI)	t-statistic (df)	P-value
Susceptibility	12.53 (3.94)	9.61 (4.71)	2.922 (0.434,5.410)	2.320 (157)	0.022*
Seriousness	24.18 (7.38)	25.16 (6.58)	-0.980 (-4.546,2.586)	-0.543 (157)	0.588
Benefit	23.80 (3.86)	23.21 (4.59)	0.590 (-1.836,3.016)	0.481 (157)	0.632
Barrier	14.20 (3.78)	14.10 (3.93)	0.103 (-1.995,2.201)	0.097 (157)	0.923
Motivation	29.13 (4.14)	28.34 (4.25)	0.798 (-1.472,3.068)	0.694 (157)	0.489

* significant at α=0.05

behavior are shown in Tables 3-5. When considering Pap smear examinations, only responses of married and ever married women (n=306) were used in the analysis as Pap smear examinations are offered to this group of women on a regular basis at Government Family Planning Clinics and Family Health Clinics. The dimensions that were significantly different between the two groups were perceived benefits, perceived barriers and health motivation. Perceived susceptibility was not significantly different between the two groups of respondents.

Table 4 shows the analysis of the dimensions associated with reported monthly BSE. The dimensions found to be significantly different were perceived barriers, confidence in carrying out BSE and health motivation. Perceived susceptibility and perceived seriousness was found not to differ between the two groups of respondents.

Only women aged over 40 years (n=159) were included in the analysis of dimensions associated with regular mammography (Table 5). There were no significant differences in perceived seriousness of breast cancer, perceived benefits of mammography, perceived barriers and health motivation. There was a significant difference in the perceived susceptibility to breast cancer between the respondents who reported regular mammogram screening.

DISCUSSION

Many studies that have reported on the validity of the HBM model as well as the Champion's HBM questionnaire[6,7,8,9,10]. The questionnaire prepared by the researchers used the validated dimensions of the Champion's HBM BSE and mammography questionnaires[3,6] as well as the HBM questionnaire used to assess cervical cancer screening beliefs[9]. Although Champion's HBM BSE questionnaire has been validated and used in the Malaysian population [11], the questionnaire for mammography screening and Pap smear screening had not. As such a pilot study was conducted on 43 schoolteachers of a secondary school in mainland Penang state. The prepared questionnaire based on the combined HBM dimensions for BSE, mammography and Pap smear as well as the socio-demographic and cancer risk questions were translated and back-translated.

After the pilot study, a number of factors that were used in the original Pap smear questionnaire had to be removed as they were not found to have as high an internal consistency as when used in the American population[9]. This was most likely due to differences in the health beliefs and social mores of the two societies (one of the factors that was removed was "Most young unmarried women I know go to have Pap test"). Although there were no changes to the mammography dimensions (perceived seriousness, perceived susceptibility, perceived benefits, perceived barriers and health motivation); the Pap smear HBM questionnaire contained no 'perceived seriousness' dimension. This could reflect the lack of knowledge of the women in the pilot study regarding cancer of the cervix but unfortunately we did not explore this further. It would be interesting to find out if there was a lack of knowledge regarding the seriousness of cancer of the cervix because a new vaccine for human papilloma virus (one of the aetiological agents for this cancer) is available. If the public does not perceive cancer of the cervix as a serious concern, there will be a lack of uptake of this vaccine. More worrying is the opposite scenario where the public can be manipulated into unnecessarily getting the vaccine because public knowledge regarding cancer of the cervix is low (i.e. the wrong group may be targeted because they may be more able to afford the cost of this new vaccine).

In general, the rates for breast cancer screening are low compared to the rates found in other studies[7,10,12]. The other studies are based on different populations. This study population comprised of predominantly Malay and Muslim ladies who are fairly well educated and are working. The constraints of time and responsibility of a full time job may make these ladies less likely to find the time to do the appropriate screening behaviour. The reasons for not doing the recommended screening behaviour could not be elucidated in this study as there were no questions in the HBM that allowed us to explore further. Other studies have recommended adding new dimensions such as 'locus of control' to the standard HBM dimensions or adding another construct: 'Theory of reasoned action and the theory of planned behaviour' especially when dealing with populations where spiritual issues are important[13].

The rate of regular Pap smear screening was less than 50% which is lower than rates reported in other populations in the United States which ranged from 82.6% to 88.9%[9].

The rate was higher than the data collected by the University Health Clinic which suggested a rate of around 25%. It is possible the respondents are getting their Pap smear examinations outside the University Health Clinic. However, the rate is still lower than ideal assuming an ideal rate of 80% of the eligible population undergoing cancer screening. The same reasons mentioned for the low rate of breast cancer screening behaviour may be responsible.

One may argue that the reporting of screening behaviour by women may not be accurate but a study has shown that the reliability and validity of reported health screening behaviour among women is high. If there was a discrepancy, it would be that women tend to underestimate the time interval since the last screening examination was done[14]. In our study we accepted a screening interval of 1 to 3 years as regular for Pap smear and up to 2 years for mammography screening so we may be over-estimating the number of women who reported 'regular'screening behaviour as the last examination. Pap smear or mammography may have been done much earlier than the cut-off point that was used in this study.

The low rates of reported screening behaviour is particularly worrying as figures from the Penang Cancer Registry show that 33.2% and 30.7% of breast cancer and cancer of the cervix are at late stages (stage III and stage IV) at the time of diagnosis[1]. One way to control cancer is to identify cancer at early stages as there is a greater probability of cure and one way to identify cancer early is to screen for cancers before symptoms are found. Cancers identified late results in higher morbidity and costs, not only to the patient but also to society in general. It is important that employers recognise that cancer screening is important and women employees must be encouraged to undergo screening. It is also important for healthcare staff to constantly emphasize cancer screening to patients at every possible encounter, when women bring their children for immunizations, when they bring sick family members to clinic or even when they themselves are ill - an appointment for a well-woman check could be made at that time. Men can also be targeted when they attend clinics by healthcare staff asking if their wives, mothers, daughters or sisters (where appropriate) have had their cancer screening checks. For Muslims, the husbands, fathers, brothers and sons could also be targeted through the sermons at the weekly Friday prayers.

Factors that were associated with regular Pap smear screening were the age and number of children whereby the older woman with the greater number of children is more likely to undergo regular Pap smear examination. This is expected as the Pap smear examination is routinely offered to all married women attending Government health facilities offering family planning services. As all doctors are required to work in the Government Health Services before working in the private sector, it is likely that most of the doctors practicing in the private sector will follow what is done in the Government Health Services. Unfortunately this means that quite a number of eligible women (women with a cervix who have ever had sexual intercourse) may

never be offered a Pap smear examination if they have never sought family planning services. Women are able to access oral contraceptive pills and condoms from pharmacies and need not even see a doctor for a prescription.

There were significant differences in the perceived benefits domain, perceived barriers domain and the motivation domain between women who reported regular Pap smear screening and those who did not. It was very highly significant in the perceived barriers domain which included factors such as "embarrassment at getting the test", "it is a painful test", "it is an expensive test", "not knowing where to go to get the test". Health education activities should concentrate on lowering these perceived barriers by educating women as to what Pap smear examinations are and giving assurances that the examination is not painful. Healthcare providers must also ensure that comfortable facilities with well trained staff are widely available to decrease physical barriers.

The motivation domain was significantly different between the women reporting regular screening for cancer of the cervix and breast cancer compared to the women who did not. There was, however, no significant difference in this domain between the women who underwent regular mammography and those who did not. The factors in this domain were general health statements rather than specific cancer statements as such it is difficult to suggest specific strategies for improvement based on the HBM framework. However, one possible way to 'motivate' cancer screening especially among working women is for employers to allow 'time off' for women to undergo such examinations. Cancer screening could also be made a requirement of any regular physical examination that workers have to undergo as part of the Occupational Safety and Health program in the workplace.

There was a highly significant difference in the confidence domain between the women who reported regular BSE and those who did not. One way to improve women's confidence in conducting BSE is to train women. This can easily be done when a woman has her annual clinical breast examination (CBE). Unfortunately the women who reported having an annual CBE were even lower than the women reporting regular BSE. Healthcare staff must ensure that women who attend clinics for whatever reason must be given appointments for an annual CBE if a CBE is not done at that particular visit. During those sessions, the women can be trained in BSE.

Since 2003, there have arisen some controversies regarding BSE and the lack of reduction of breast cancer mortality among women who practice BSE regularly[15,16]. The very low rates of mammography screening reported by the respondents mean that we cannot rely on mammography as an effective population screening modality at this time. The accepted recommendation for mammography screening is that screening is to be done on women over 40 years of age as there is difficulty in getting good images in younger breasts. However, breast cancer in Malaysia seems

to affect a younger age-group compared to the figures from developed countries[17], and if we rely on mammography only as a population screening modality, we may be missing early breast cancer cases among younger women. This means that we still need to continue recommending BSE to the women as well as improve the rate of CBE not only by ensuring adequate numbers of trained healthcare staff and comfortable facilities but also by educating the women regarding the importance of undergoing a CBE in addition to the monthly BSE.

CONCLUSIONS

This study found that the level of regular screening activities reported by the respondents to be generally low, 42.5% reported regular Pap smear screening, 20.9% reported regular BSE, 15.5% reported undergoing a regular CBE and only 9.4% of women aged over 40 years reported regular mammography screening. The low levels of BSE done regularly and of reported mammography screening is particularly worrying as breast cancer is a leading cause of cancer deaths among women. There was no difference in perceived seriousness of breast cancer among the respondents but those who did not do regular BSE did report a lack of confidence in conducting BSE. There is less need to emphasize on the seriousness of the disease but more effort should be made in clinics to train women in how to conduct BSE as this may help increase women's confidence for doing regular BSE.

Less than half of the women who should be getting regular Pap smear examinations report getting them and efforts to increase this number should concentrate on reducing the perceived barriers that were measured in this study (such as embarrassment in doing the examination, perceived pain on undergoing examination, lack of knowledge as to the availability of the examination). Comfortable facilities with trained female healthcare staff to conduct the Pap smear examination (and CBE) may help to increase the rate of regular cancer screening by the women.

ACKNOWLEDGEMENTS

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