

RESEARCH ARTICLE

Knowledge and Beliefs of Malaysian Adolescents Regarding Cancer

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Abstract

Background: Few studies have explored the knowledge and attitudes of adolescents toward cancer prevention and treatment. This lack of research and its potential utility in the development of new educational initiatives and screening methods, or the reconstruction of existing ones, provided the impetus for this study. The primary research aim was to assess secondary school student knowledge of cancer and determine whether or not they possessed basic knowledge of cancer symptoms, risk factors, and treatments and to determine the relationship between cancer knowledge and key demographic factors. **Materials and Methods:** The Management and Science University conducted a cross-sectional study analyzing responses through cross-tabulation with the socio-demographic data collected. **Results:** The findings of our quantitative analysis suggest that Malaysian youth generally possess a moderate knowledge about cancer. Quantitative analyses found that socioeconomic inequalities and bias in education present as important factors contributing to cancer awareness, prevention, and treatment among Malaysian adolescents. **Conclusions:** The findings indicate that Malaysian youth generally possess a moderate knowledge about cancer but the current deficiencies in initiatives directed to cancer awareness continue to hinder the improvement in prevention of cancer among Malaysian adolescents.

Keywords: Adolescents - cancer - knowledge - beliefs - Malaysia

Asian Pac J Cancer Prev, 16 (3), 1097-1103

Introduction

Malaysia's population of slightly greater than 29 million citizens is rich in ethnic, linguistic, and sociocultural diversity. Although its 13,904,800 ethnic Malays constitute the demographic majority (49.5%), Malaysia has a significant number of ethnic Chinese, Indian, and indigenous citizens who number approximately 6.4 million, 1.9 million, and 3 million and constitute 22.9%, 6.8% and 10.7% of the population respectively in 2010 (Jaafar et al., 2012).

Over the past several decades, rapid industrialization and substantial economic growth have precipitated a demographic shift in Malaysia's urban population, with a gradual increase from 27% in 1970 to 70% of the current total population now living in urban areas (Jaafar et al., 2012). The health outcomes associated with this economic prosperity, urbanization, and continual healthcare reform for its citizens have been profound. Since 1970, for example, the average life expectancy for Malaysian men and women has increased from 61.6 years and 65.6 years respectively to 72 and 76 years (WHO Country Health, 2013). Furthermore, 96% of the population now enjoys improved access to sanitation and

100% has access to an improved drinking water source (WHO Cooperation Strategy, 2013). In turn, improved drinking water sources and improved access to sanitation, together with the expansion of healthcare clinics and initiatives into rural areas (Jaafar et al., 2012), extensive immunization programs, and a competitive two-pronged health care system, have driven down the morbidity and mortality rates related to many communicable diseases (Jaafar et al., 2012). However, the same industrialization, economic growth, and urbanization that contributed to these positive health outcomes have simultaneously introduced lifestyle changes and occupational hazards that have led to rising incidences of non-communicable diseases such as diabetes, heart disease, and cancer (Jaafar et al., 2012). Of particular concern to public health is the rapid and significant expansion of the textile industry, which began during the Second Malaysia Plan in the early 1970s and which now accounts for 2.3% of Malaysia's manufacturing exports (Malaysia External Trade Development Corporation, 2014).

According to the Malaysian Ministry of Health, cancer is the third most common certified cause of death among Malaysian citizens (Omar et al., 2011). Data from the National Cancer Registry (NCR) and affiliated

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State Cancer Registries show that, of the 18,219 new cancer cases diagnosed and registered in 2007, 3292 (18.1%) were identified as breast cancer, 2246 (12.3%) as colorectal cancer (CRC), 1865 (10.2%) as tracheal, bronchial, and lung cancer, 940 (5.2%) as nasopharyngeal cancer, and 847 (4.6%) as cervical cancer (Omar et al., 2011). Breast cancer, colorectal cancer, and cervical cancer were the three most common cancers among Malaysian women and accounted for 50.5% of all cancer cases in females. Breast cancer alone comprised 32.1% of all cancer cases. Conversely, tracheal, bronchial, and lung cancer constituted 16.3% (1320) of all cancer cases among Malaysian men, followed by colorectal cancer with 14.6% (1185) of total cases and nasopharyngeal cancer with 8.4% (685) (Omar et al., 2011).

Moreover, of the 8,869 (48.7%) of cases with reported staging, 25.0% were reported as stage III and 32.7% as stage IV (Omar et al., 2011). Otherwise stated, “of those staged, 57.6% were already at advanced stages of cancer.” These statistics find confirmation in a myriad of other studies wherein Malaysian participants were diagnosed or treated for cancer only after the disease had reached an advanced stage of development (Omar et al., 2011). This trend is puzzling within the context of the Malaysian healthcare system wherein the Ministry of Health often fully subsidizes cancer screening and treatment for all citizens (Jaafar et al., 2012).

Researchers have undertaken a multitude of studies to identify the causes of poor screening adherence and barriers to access to care among Malaysians of all ethnic, religious, and socioeconomic backgrounds. The literature elucidates the numerous psychological, sociocultural, religious, and practical barriers to access to care, including, but not limited to: fear of pain, embarrassment, or shame (Yusoff et al., 2012); a public healthcare system encumbered by a staggering demand for its meager supply of medical specialists, advanced medical equipment, and cancer centers (Yip et al., 2006); the perception of cancer as a divine test or punishment (Hisham and Yip, 2004); and patriarchy (Norsa'adah et al., 2012).

The overwhelming majority of barriers to screening and access to care are ultimately caused by a lack of knowledge regarding the risk factors, symptoms, screening methods, and treatments associated with different cancers (Marriam and Muhamad, 2013). Indeed, current cancer prevention and treatment programs in Malaysia have generally proven inadequate in effectively promoting awareness of cancer symptoms, screening methods, and treatment. There are currently no national screening programs for colorectal (Loh et al., 2013), breast (Leong et al., 2007), lung (Sachithanandan and Badmanaban, 2012), or nasopharyngeal cancer (Nor Hashim et al., 2012), although there have been targeted education programs. For example, an initiative enacted by the Ministry of Health in 1993 to establish breast cancer clinics in all major public hospitals failed due to a “shortage of resources and manpower in every category” (Hisham and Yip, 2004). Various ministries have launched a breast cancer awareness campaign since then to promote Breast Self-Examination (BSE), clinical breast exams (CBE), and mammography through health education, the

publication of clinical practice guidelines, and subsidies for women with a high risk of breast cancer (Yip et al., 2006). Although neither CRC nor nasopharyngeal cancer have benefited from similar public media campaigns (Al-Naggar and Bobryshev, 2013), lung cancer has gained exposure through the national anti-smoking campaign ‘Tak-Nak’ which, some researchers posit, has improved knowledge of lung cancer and its risk factors among younger generations of Malaysians (Al-Naggar 2012). Nonetheless, the paucity of knowledge regarding screening is concerning: in one recent study conducted to assess the knowledge of and attitude toward colorectal cancer screening among 1,095 moderate-risk patients in West Malaysia, only 4.1% of participants demonstrated ‘good knowledge’ of CRC symptoms, 3.3% expressed positive attitudes towards CRC screening, and less than 1% had undergone CRC screening (Harmy et al., 2011). Studies reporting similar knowledge gaps regarding breast (Norsa'adah et al., 2012), nasopharyngeal (Nor Hashimet et al., 2012), and even lung cancer abound (Al-Naggar and Kadir, 2013).

The single national screening program for cervical cancer has consistently failed to reduce morbidity and mortality since its inception in 1969. The Ministry of Health subsequently launched a national HPV immunization program in 2010 to inoculate adolescent schoolgirls against potential HPV infection and thereby significantly reduce their risk of developing cervical cancer. The HPV vaccination program has had great initial success with the vaccination of 87.12% of 13 year-old Malaysian schoolgirls in 2011 alone (Ezadet et al., 2013). Critics, however, caution that the immunization program does nothing to reform the national screening program, raise awareness of cervical cancer, or lower the risk of contracting HPV for Malaysian women over the age of 13 (Al-Naggar et al., 2012).

In addition to the structural limitations of the national health care system and increasing cancer incidence rate, the failure of existing cancer prevention programs in Malaysia to fill critical knowledge gaps and promote positive screening behavior highlights the importance of primary prevention and positive lifestyle changes to decrease cancer risk.

Enrollment in a public university or other institution of higher learning in Malaysia follows the successful completion of six years of ‘Takun’, or primary education, five years of ‘Tingaktan’, or secondary education, and one to two years spent in preparation for the SPM. Estimates of Malaysia’s current tertiary education gross enrollment ratio ranges between 28.2% and 36%. These estimates in particular represent a considerable achievement, especially considering that gross enrollment rates for the population of tertiary age in 1991, 1999, and 2002 were 8%, 23%, and 27% respectively (UNESCO Institute for Statistics-School Enrollment, 2013).

The average age of matriculation among Malaysian citizens at a tertiary education institution is between 19 and 20 years old. Furthermore, 17% of Malaysia’s population of approximately 29.24 million people, or 2,552,709 men and 2,487,366 women, fall within the 15-to-24 age bracket (CIA World Fact Book, 2013). As a result, if one

were to grossly divide the bracket in half and account for separate male and female rates of enrollment (33% and 39% respectively) (UNESCO Institute for Statistics-School Enrollment, 2013), then one would estimate the gross number of Malaysian men and women enrolled in institutions of higher learning at approximately 1.81 million, or 6.2% of the total population.

Despite this positive trend in tertiary enrollment among Malaysia's tertiary age population, substantial bias in the Malaysian system of higher education persists. Persistently low intake rates of ethnic minorities among Malaysian public universities have buoyed the perception of the abolition of the ethnic quotas for admissions into public universities in 2002 as having largely been a perfunctory measure. In 2013, for example, that "of the 41,573 places in government-funded universities available, 19% were awarded to ethnic Chinese and 4% to ethnic Indians" caused an outcry in both communities who insist that the higher education system has become less equitable, if anything (Pak, 2013).

Previous studies conducted in Malaysia have generally focused on the knowledge, attitude, and practices of university students, moderate-to-high risk groups, and cancer patients toward specific cancers. Few, though, have yet explored the knowledge and attitudes of adolescents toward cancer prevention and treatment in contrast to work done by researchers in the United States (Morales-Campos et al., 2013), Australia (Gunasekaran et al., 2013), Thailand (Temparket et al., 2012), and other countries. This lack of research and its potential utility in the development of new educational initiatives and screening methods, or the reconstruction of existing ones, provided the impetus for this study. The primary research aim was to assess secondary school students' knowledge of cancer and determine whether or not they possessed basic knowledge of cancer symptoms and treatments.

Materials and Methods

The study was approved by the Management and Science University's Institutional Review Board. All necessary processes were used to protect the privacy of participating students, all of whom completed signed consent forms before the questionnaire was provided to them. This cross-sectional study was conducted by the Management and Science University from June through September of 2011. Researchers obtained consent from study participants through the distribution and collection of consent forms.

Study aims

The Management and Science University jointly conducted a cross-sectional study from June through September of 2011 to assess the knowledge of cancer risk factors, symptoms, preventive measures, and treatment methods among Malaysian adolescents. The specific aims of the study were to: 1) assess the knowledge of cancer risk factors, symptoms, preventive measures, and treatment methods among Malaysian adolescents; and 2) determine the relationship between a respondent's cancer knowledge and key demographic factors.

Sample

Researchers first randomly selected ten out of twenty-four potential secondary schools in Shah Alam, the state capital of Selangor, Malaysia, to participate in the present study. Researchers selected participating schools by writing the names of all elementary-middle schools in Shah Alam on small folded pieces of paper and placing them in a container. They then shook the container and chose ten pieces of paper at random. The following schools were selected: Sekolah Menengah Kebangsaan Bukit Jelutong and Sekolah Menengah Kebangsaan Sultan Salahudin Abdul Aziz Shah.

The study sample comprised 261 students attending these ten randomly selected secondary schools. Once the researchers had received permission from each school's faculty and administration, trained research assistants entered the classrooms, randomly selected a number from one to ten, and, starting with that number, chose every fifth student as a potential study participant until the required sample size was obtained. The researchers then individually consented the selected students in the absence of any teacher. If a student did not agree to participate, the next student was selected. After collecting signed consent forms from the randomly selected participants, researchers then distributed the questionnaire to those who were selected and agreed to participate. This was also carried out in the absence of any teacher.

Research Instrument

The principal investigator (PI) developed the questionnaire based on a comprehensive literary review of studies conducted on cancer knowledge among adolescents. The questionnaire itself was written in Malay and consisted of three sections.

The first section featured questions regarding participants' sociodemographic characteristics, including: age, sex, race, religion, height, weight, parental marital status and education levels, monthly family income, and smoking status.

The second section focused on items related to cancer: the definition of cancer; the difference between cancer and a tumor; the incidence of different cancers among men and women; causes, signs, and symptoms of cancer; cancer screening methods; the stages of cancer; whether or not a cure for cancer exists; and the different methods available for cancer treatment.

The third section explored participants' beliefs concerning the efficacy of different traditional medicine in treating and curing cancer. The questionnaire's final section proposed several lifestyle changes as prophylactic measures against cancer, such as: reduced nicotine and alcohol consumption; a healthy diet; regular exercise; stress reduction; and regular medical checkups.

Data analysis

Researchers analyzed the responses to questions regarding cancer knowledge through cross-tabulation with the sociodemographic data collected. Chi-square values for all cross-tabulations were analyzed with a significance value of $p < 0.05$. PASW SPSS 22.0 was used as the data analysis program.

Results

Demographics

The study sample consisted of 261 adolescent participants whose ages ranged from 9 to 22 years old with a mean age of 14.0. The overwhelming majority of the respondents (95.4%) were Malay and nearly two-thirds (63.7%) were female. In terms of parental education, more than half of study participants (56.2%) had fathers who had received a college degree or higher; indeed, just over one-quarter of these participants had fathers who had attained either a Master’s degree or a PhD. Conversely, 48% of participant mothers had received a college degree or higher while only 17.8% had obtained either a Master’s degree or PhD. Regarding family income, 50.2% of participants reported a monthly family income of RM 5000, or approximately \$1,642.83 whereas 49.8% reported a monthly family income greater than or equal to RM 5000. Furthermore, only 10 respondents (3.9%, with two non-respondents) claimed to be smokers, and 47 respondents (19.1%, with 15 non-respondents) reported a family history of cancer.

Knowledge of cancer

To assess participant knowledge of cancer, researchers first asked participants to respond to a series of knowledge-

Table 1. Demographic Statistics of Study Population

Demographic	N	Mean	Std. Deviation	Min	Max
Age	260	14	1.424	13	22
BMI	221	19.8	3.998	13	34
		Most Frequent Group	Frequency Total*		Percent*
Sex		Female	164	259	63.3%
Race		Malay	248	260	95.4%
Father Education		Degree	68	226	30.1%
Mother Education		SPM	76	225	33.8%
Monthly Income		<RM 5000	111	221	50.2%
Smoking Status		No	249	259	96.1%
Family history of cancer		No	199	246	80.9%

*:Respondents

Table 2. Cancer Knowledge, Gender and Household Income

Differences in Knowledge across sex	Male Frequency Yes (%)	Female Frequency Yes (%)	P-value	Degrees of Freedom	Pearson Chi-Square Value
Genetics as risk factor	61 (67.8%)	122 (80.3%)	0.029	1	4.78
Radiation as risk factor	53 (63.1%)	117 (77.5%)	0.018	1	5.58
Bacterial Infection as risk factor	62 (70.5%)	129 (81.6%)	0.043	1	4.08
Rashes as symptom	34 (59.6%)	38 (35.5%)	0.003	1	8.80
Changes in Bowel Habits as symptom	48 (78.7%)	62 (53.9%)	0.001	1	10.4
Change in Mole Size as symptom	48 (77.4%)	67 (58.3%)	0.011	1	6.50
Stress Reduction as Prevention	36 (65.5%)	55 (46.6%)	0.021	1	5.34
Differences in Knowledge across Monthly Income	<RM 5000 Frequency Yes (%)	>=RM 5000 Frequency Yes (%)	P-value	Degrees of Freedom	Pearson Chi-Square Value
Benzene as Risk Factor	82 (84.5%)	79.8 (70.9%)	0.021	1	5.35
Radiation as Risk Factor	63 (64.3%)	81 (78.6%)	0.024	1	5.09
Tobacco Consumption as risk factor	63 (64.9%)	89 (84.8%)	0.001	1	10.6
Unusual Bleeding Discharge as Symptom	55 (68.8%)	71 (82.6%)	0.038	1	4.32
Continuous Flu as Symptom	40 (58.0%)	30 (40.0%)	0.031	1	4.65

based questions. For example, one question involving the identification of various definitions of cancer asked respondents to check all that apply with respect to the following: cancer is abnormal cells divide without control and is able to invade other tissues; cancer is the general name for a group of more than one hundred diseases in which cells in a part of the body begin to grow out of control; cancer is an uncontrolled proliferation of cells; cancer is a disease. Among those who responded to the question (165 out of the 261 surveyed), 94 individuals (57%) provided the correct definition for cancer.

When posed questions concerning gender-specific forms of cancer, only 7.8% (257 respondents) knew that breast cancer could affect both men and women, while 79.5% (224 respondents) correctly identified prostate cancer as affecting males exclusively. Furthermore, just over half (51%, or 255 respondents) understood that lung cancer could affect both genders, while 43.5% (209 respondents) believed that both men and women could develop colon cancer. Additionally, 94.8% (250 respondents) knew that ovarian cancer affects females only, 81.9% (226 respondents) knew that testicular cancer affects only males, and 44.4% (232 respondents) that thyroid cancer affects members of both genders.

Only slightly over half (57%) of the sample population overall selected the proper definition of cancer

Study participants generally demonstrated a moderate knowledge of cancer vis-à-vis gender-based incidences. Participants most frequently experienced success in the attribution of incidences of ovarian cancer (94.8%), testicular cancer (81.9%), and prostate cancer (79.5%) to a specific gender. Conversely, participants experienced the least success regarding gender-specific incidences of lung cancer (51.0%), thyroid cancer (44.4%), colon cancer (43.5%), and breast cancer (7.8%).

Risk factors

In terms of participant knowledge regarding the risk factors of cancer, 78.4% (236 respondents) believe that contact benzene and other chemicals are a risk factor; 71.3% (244 respondents), that excessive

alcohol consumption is a risk factor; and 50.4% (238 respondents), that excessive exposure to sunlight is a risk factor. Regarding biological risk factors, 75.8% (244 respondents) thought that genetic factors could cause cancer whereas 73.5% (245 respondents) viewed viruses as a risk factor and 77.8% (248 respondents) believed that bacterial infections could lead to cancer. Other perceived risk factors of cancer (>50% yes) included radiation (72.2%, or 237 respondents), obesity (56.1%, or 246 respondents), tobacco consumption (73.6%, or 231 respondents), unsafe sex (69.8%, or 242 respondents), and carcinogenic material (94.0%, or 232 respondents).

Symptoms

Respondents' perceived signs and symptoms of cancer (>50% yes) included: unexpected weight loss (189 respondents, or 76.2%); skin abnormalities (193 respondents, or 77.7%); sores that never heal (93 respondents, or 66.3%); unusual bleeding discharge (190 respondents, or 75.3%); a continuous flu (172 respondents, or 51.7%); nausea and vomiting (174 respondents, or 60.3%); changes in bowel habit (177 respondents, or 62.1%); lump formation (208 respondents, or 88.0%); indigestion (167 respondents, or 52.7%); bloody stools (88 respondents, or 71.3%); and a change in mole size (178 respondents, or 64.60%). Respondents did not perceive rashes (165 respondents, or 43.6%) or hoarseness (165 respondents, or 49.7%), as signs of cancer.

Prevention

Participants generally considered all five proposed methods for cancer prevention as viable prophylactic measures. Reducing smoking and alcohol consumption 86.9% (222 respondents); a healthy diet 88.9% (226 respondents); regular exercise 83.6% (220 respondents); reducing stress 52.3% (174 respondents); and regular check-ups 90.7% (216 respondents) were all considered valid prevention methods for cancer by the study population.

Beliefs regarding cancer treatment options

When asked if there is a cure for cancer, 145 (55.7%) indicated that there was. The youth were then asked to select the treatments that they believe can reduce or cure cancer; of the six options presented, those most frequently selected by the youth were: chemotherapy (61.5%); homeotherapy (40.3%); removal of tumor/surgery (51.9%); medication (50%); radiotherapy (37.7%); and cyberknife (9.6%).

The youth were asked if traditional treatment can reduce or cure cancer; 58% responded positively. When asked which of four traditional cancer treatments they were aware, most (87.0%, or 138 respondents) selected herbal therapy, followed by 75.4% (126 respondents) who selected natural therapy, and 50.5% (109 respondents) selecting nutrition therapy. Only acupuncture was known by less than half of the youth (45.5%, or 101 respondents).

Discussion

The findings of our quantitative analysis suggest that

Malaysian youth generally possess a moderate knowledge of the causes, symptoms, risk factors, and treatments associated with cancer.

Study participants were primarily Malay females (95.40%, 63.30%) with a mean age of 14 whose fathers had obtained college degrees (30.10%) and whose mothers had taken the Sijil Pelajaran Malaysia (SPM) required for university admission (33.80%). This relatively high percentage of study participants with either mothers or fathers who had obtained a bachelor's degree, master's degree, or PhD indicates that study participants belonged to families whose levels of higher education far exceeded the norm.

The aforementioned trends in tertiary level gross enrollment rates suggest that the high proportion of study participants whose parents have obtained a bachelor's degree or higher is not the norm.

The average age of marriage in Malaysia increased from 25.5 years old for men and 22 years old for women in 1970 (NaiPeng, 2006) to 28.6 and 25.1 in 2010 (Department of Statistics, Population Distribution, 2011). Given the likelihood that the age of marriage among parents of study participants more directly corresponds with the 1970 estimates, and in light of the average age of tertiary level matriculation, we may safely estimate that the average age of participant parents hovers around 44.5 years for fathers and 41 for mothers. Even if one retroactively applied the enrollment rate of 1991 to all preceding years, the number of Malaysian men and women of Malaysian ethnicity who obtained college-level degrees in the former half of the 1970's would still have been extraordinarily small in comparison. Therefore, the significant proportion of study participants with university-educated mothers and fathers have likely grown up in unusually educated households suggests that they would be more likely to have better health awareness and practices than the general population. Education also contributes to more positive health outcomes (Cutler et al., 2007).

Conclusions drawn from a linkage of the survey results, the high proportion of study participants with highly educated parents, and the positive correlation between education and health may also explain in part participants' smoking status. The percentage of study participants who self-identified as non-smokers (96.1%) represents a statistical anomaly in a country where 36.3% of adolescent boys and 4.2% of girls between the ages of 13 and 15 regularly smoke cigarettes (World Lung Foundation, 2013). Although Malaysian girls constituted the majority of our sample population, the proportions of Malaysian adolescents who smoke are such that one would have expected at least 15.98% of participants to smoke. Potential limitations posed by the sample size aside, the high proportion of participants with highly educated parents presents itself as a plausible explanation for this phenomenon as, macroeconomic conditions permitting, a higher level of education allows one to obtain a higher paying job. Moreover, in a recent study conducted on the epidemiology of smoking among Malaysian adult males, Lim et al. (2013) found that "Malaysians with low socioeconomic status had greater smoking rates than

those with high socioeconomic status.” The implications of these socioeconomic trends for our study are profound, particularly in light of the fact that: a) 49.8% of participants reported living in households that earn a monthly income greater than or equal to 5000 RM; and b) the higher frequency with which these participants identified tobacco consumption as a potential risk factor for cancer. All participants undoubtedly benefit economically from their location in that urban residents in Malaysia enjoy a mean monthly gross household income 1.8 times greater than that earned by citizens living in rural areas (Laman Web Rasmi Economic Planning, 2013).

The variations in knowledge of gender-specific forms of cancer among study participants reflect the nature of the questions posed as well as the Malaysian policy emphasis on awareness campaigns for certain types of cancer and not others. Concerning the questions themselves, a rudimentary knowledge of the human anatomy is all that one would need to be able to divine gender-specific incidences of certain cancers based on nomenclature alone. Participants’ general success in the successful attribution of the correct gender to incidences of ovarian cancer, testicular cancer, and prostate cancer and subsequent failure to do so vis-à-vis cancers of the lung, thyroid, colon, and breast provide particularly strong evidence in this regard. The normative conflation of cigarette smoking with masculinity in Malaysian society almost certainly explains why almost as many participants (47.1%) misidentified lung cancer as exclusively afflicting males as those who correctly asserted that it could affect either gender. Similarly, the feminine connotation of the Malay word payudara in kankerpayudara, the Malay term for breast cancer, likely led all but 7.8 percent of participants to identify breast cancer as exclusively affecting females.

In the Malaysian context, however, the high percentage of respondents who identified breast cancer as an exclusively female cancer bespeaks more than linguistic clues and feminine undertones. Breast cancer, as was previously mentioned, is the most common cancer among Malaysian women and accounted for 18.1% of all new cancer cancers diagnosed and registered with the National Cancer Registry in 2007. Moreover, the Ministry of Health along with other government ministries, public media outlets, and non-governmental organizations have endeavored to develop cancer prevention and treatment programs as well as series of high profile media campaigns since the early 1990’s in the hopes of breast cancer awareness and improving screening adherence among Malaysian women. As a consequence, cancer of the breast in Malaysia has occupied a more prominent position in the national consciousness than any other cancer.

Although several studies have questioned their overall efficacy, the results of our inquiry raise the possibility that public media campaigns waged for breast cancer awareness have in some sense increased awareness of both the disproportional rate at which breast cancer affects women as well as its symptoms. The sheer proportion (91.4%) of study participants who identified incidence of breast cancer with women exclusively constitutes at least moderate evidence for the former conclusion. The latter conclusion finds confirmation in the discovery that, out of

thirteen total options, lump formation (88%), skin changes (77.70%), and sores that never heal (66.30%) were the first, second, and sixth phenomena most frequently identified by participants as cancer symptoms. These three symptoms are more commonly associated with breast cancer than any of the six other cancers presented in this study and thus indicate a greater potential knowledge of breast cancer-specific symptoms than any other among adolescent participants.

If valid, these conclusions bolster the growing number of other studies and reports that lament the lack of effort and resources directed toward the development of similar awareness campaigns regarding the signs, symptoms, and screening methods associated with other cancers.

In conclusion, the Malaysian adolescents surveyed demonstrated a moderate knowledge (e.g. < 50% correct responses given) of the symptoms, risk factors, treatment methods, and gender-specific incidences associated with cancer. Nevertheless, the nature of the questions posed in regard to gender-specific incidences of cancer was such that participants’ general knowledge of cancer may be less profound than the data would suggest.

Furthermore, when viewed through the lens afforded by the study, participants’ sociodemographic characteristics and responses, the quantitative results of the survey reflect the socioeconomic inequalities, bias in education, and myopic foci of current awareness initiatives that continue to hinder the improvement of cancer awareness, prevention, and treatment among Malaysian adolescents. First, the significant percentage of participants who reported unusually high parental education levels were, by virtue of their parents’ background, more likely to have developed a greater health awareness than adolescents living in less-educated households. Second, the positive correlation between education and affluence in tandem with the high percentage of participants who indicated having a monthly family income that far exceeded the average for Malaysian citizens of Malay ethnicity indicate that many participants likely enjoyed better access to and preferential treatment in the education system as opposed to ethnic minorities or Malays occupying a lower socioeconomic rung. Third, the centrality of Shah Alamas as a developed urban center and the state capital of Selangor would have provided participants with better access to health services and greater exposure to cancer awareness campaigns than their rural counterparts. Consequently, it remains uncertain whether or not the majority of other Malaysian adolescents have cultivated a similar knowledge of cancer and associated symptoms, risk factors, and treatment methods.

If there is an association between the public media campaign for breast cancer, the urban residency of study participants, and their knowledge of breast cancer highlight the potential success of initiatives in the dissemination of critical knowledge, then our inability to generalize the results of our study underscores the need to adapt future awareness initiatives to account for the practical barriers that have prevented similar initiatives from reaching populations living in isolated or rural, poor areas in the past. Malaysia’s continued progress in the improvement of awareness of and adherence to cancer

screening among its citizens thus depends primarily upon its ability to expand the scope of outreach efforts beyond breast and lung cancer and design initiatives that extend beyond the urban periphery.

Acknowledgements

The authors wish to thank the Management and Science University, and Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia, for support of our study.

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