Al-Rafidain J Med Sci. 2021;2-14-18.

Original Article

Knowledge and Awareness of Genetic Tests Available for Risk of Breast Cancer among Female Students in UiTM

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Received: June 2021; Revised: July 2021; Accepted: August 2021

Abstract

Background: Malaysians were less informed regarding genetic tests compared to developed countries. Little knowledge and interests in genetic testing for the risk of breast cancer detection are available for the students in University Technology Mara (UiTM). ***Aim***: To detect the knowledge and awareness in genetic tests available for the detection risks of breast cancer among UiTM female students. ***Methods***: A cross-sectional study using a self-administered questionnaire was conducted among medical and non-medical undergraduate students of the University Technology Mara (UiTM). A convenient sample was collected from those who fulfilled the inclusion criteria of this study. ***Results***: Three hundred and eighty-six respondents were involved in the present study. 50.8% of them were familiar with the tests, while 49.2% did not know about the availability of tests that detect gene mutations. Regarding their interest to detect inheritable mutations, 35.8% were interested in the test, 38.3% were probably interested, 20.7% were considering the test, and 5.2% had no interest in the test at all. About their concerns about mutations detection, 67.9% agreed to get tested to learn their expected risk of getting breast cancer. In terms of their reason to avoid being tested, 40.7% better to be changed. ***Conclusion***: There were inadequate knowledge and awareness in breast cancer genetic tests in tested female students. They are highly interested in the genetic test available for breast cancer risk detection.

Keywords: Breast cancer, BRCA1/2 gene, Genetic test, UiTM

المعرفة والوعي في الاختبارات الجينية المتاحة لخطر الإصابة بسرطان الثدي بين الطالبات في UiTM

الخلاصة

الخلفية: كان الماليزيون أقل اطلاعا على الاختبارات الجينية مقارنة بالبلدان المتقدمة. تتوفر القليل من المعرفة والاهتمامات حول الاختبارات الجينية لخطر الكشف عن سرطان الثدي للطالبات في جامعة التكنولوجيا مارا. **الهدف**: الكشف عن المعرفة والوعي في الاختبارات الجينية المتاحة لمخاطر الكشف عن سرطان الثدي بين الطالبات في UiTM. **الطرائق**: أجريت دراسة مقطعية باستخدام استبيان ذاتي الإدارة بين طالبات الجامعة في الأختصاصات الطبية وغير الطبية في جامعة التكنولوجيا مارا. تم استهداف عينة مناسبة من الطالبات اللواتي استوفين معايير الإدراج في هذه الدراسة. **النتائج**: شارك في هذه الدراسة ثلاثمائة وستة وثمانون طالبة. 50.8٪ منهن على دراية بالاختبارات، في حين أن 49.2٪ لم يعرفن عن توافر الاختبارات التي تكشف الطفرات الجينية. وفيما يتعلق باهتمامهن بالكشف عن الطفرات الموروثة، كان 35.8٪ مهتمات بالاختبار، و38.3٪ ربما كن مهتمات، و20.7٪ يفكرن في الاختبار، و5.2٪ لم يكن لديهن اهتمام بالاختبار على الإطلاق. حول مخاوفهن بشأن الكشف عن الطفرات، وافق 67.9٪ على إجراء اختبار لمعرفة المخاطر المتوقعة للإصابة بسرطان الثدي. **الاستنتاج**: لم تكن هناك معرفة كافية ووعي في الاختبارات الوراثية لسرطان الثدي لدى الطالبات اللاتي تم اختبارهن. وكن مهتمات للغاية بالاختبار الوراثي المتاح للكشف عن مخاطر الإصابة بسرطان الثدي.

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Article citation: Syed Hussin SN. Knowledge and awareness in genetic tests available for risk of breast cancer among female students in UiTM. *Al-Rafidain J Med Sci*. 2021;1:14-18.

INTRODUCTION

Breast cancer is a disease that affects the somatic cells of the breast by genetic alterations, which can occur in both men and women. However, breast cancer is more common and mainly happened among women. Yearly the total number of new cases of breast cancer diagnosed around the world exceeds one million [1]. In Malaysia, breast cancer is considered the most common cancer diagnosed among women, it represents 31% of the total number of newly diagnosed cancer cases [2]. Several risk factors may trigger the incidence of breast cancer in a woman. These risk factors include alcohol and drug consumptions, radiation exposure, sedentary life, high breast density, familial history, hormonal influences, and genetic variants such as BRCA 1please put the full name of BRCA when mentioned for the first time and BRCA 2. However, a study conducted in Malaysia demonstrated a lack of knowledge about the risk factors of breast cancer such as childbirth at more than 30 years old, contraceptive pills, obesity, hormone replacement therapy, menopause after the age of 50, and menarche before age [2]. The risk of breast cancer incidence will significantly increase when one of the woman's first relatives had breast cancer [3]. Moreover, it has been detected that the incidence of mutations within BRCA1 and BRCA2 will increase the chances of breast cancer incidence [4]. Genetic mutations proved to be one of the risk factors for breast cancer, and there are even genetic tests available for the risk factor assessment [5]. However, the interests and knowledge about genetic testing for the risk of breast cancer among female students of UiTM are not well-documented. Therefore, the current study aimed to detect the level of knowledge and interest in genetic tests available for the detection risks of breast cancer incidence among UiTM female students.

METHODS

Study design

This study is a cross-sectional design to investigate the correlation between knowledge and awareness of female students in the UiTM regarding genetic tests available for risk of breast cancer, using a self-administered questionnaire.

Sampling method

The sample includes female students at UiTM who fulfilled the inclusion criteria of this study. It involved both the medical faculties and non-medical faculties of UiTM. The participants were briefed concerning the survey, such as the importance and purpose of completing this study.

Sample size

A total of 386 students (193 from medical faculties and 193 from non-medical faculties) were enrolled in this study. They fulfilled all the inclusion criteria.

Data collection

Data collection was started after the approval of ethics (UiTM Ethical Committee) was obtained. The data was collected by using a self-administered questionnaire that required approximately 15 minutes for one participant to complete the questionnaire. Information involving demographic data, level of interest, awareness, and knowledge was obtained.

Data analysis

The collected data was analyzed using Statistical Package for the Social Sciences software (SPSS). It was analyzed as descriptive statistics to characterize the samples and was tested with Chi-Squared Test of Independence to detect if there were any significant associations between the groups, and Spearman's Rho Correlation Coefficient to detect correlation, with a significant value of $P<0.05$.

RESULTS

The respondents were aged between 19 to 26 years old with the majority of the respondents were from the age group 21 to 22 years old. The mean age reported was 21.28 years with a standard deviation of 1.253. Almost all of the respondents of the present study were Malays (382) and the 4 others were Melanau, Bisaya, Dusun, and Kenyah race, respectively.

Table 1: Sociodemographic characteristics of respondents (N=386)

Variables	*n*	%
Age (years)		
≤20	101	26.2
21-22	222	57.5
23-24	60	15.5
≥25	3	0.8
Mean	21.28	
Std. Deviation	1.253	
Minimum	19	
Maximum	26	
Race		
Malay	382	99.0
Others	4	1.0
Marital Status		
Single	381	98.7
Married	5	1.3
Study Field		
Medical	193	50.0
Non-Medical	193	50.0
Description of Hometown		
Urban	258	66.8
Rural	128	33.2
Family History of Breast Cancer		
Yes	43	11.1
No	343	88.9
Personal History of Breast Cancer		
Yes	2	0.5
No	384	99.5

In terms of their marital status, the majority of them were single and only a few of them were already married. Regarding the educational background or their study field,

50.0% of the respondents were from non-medical faculties and the other 50.0% were from the medical faculties such as pharmacy faculty. Moreover, the respondents came from various places, 66.8% of the respondents originated from urban areas while 33.2% came from rural areas. In respect to their association with breast cancer, approximately 11.1% had first or second-degree relatives suffering from or had suffered from breast cancer disease before. While the other 88.9% have no family members that experience breast cancer. In addition to this, 0.5% of the respondents had personal experience and were diagnosed with breast cancer. 99.5% have no personal medical history of breast cancer (Table 1).

Table 2 showed the levels of familiarity of respondents about breast cancer genes; 20.2% of them have heard and known quite a lot about the genes that are associated with breast cancer incidence.

Table 2: Knowledge about breast cancer genes, genetic testing to detect inheritable mutations and personal risk of breast cancer

Variables	*n*	%
Familiarity with breast cancer genes		
A lot	78	20.2
A Fair Amount	133	34.5
A Little Bit	158	40.9
Almost Nothing	17	4.4
Familiarity with genetic testing of inheritable mutations		
No	190	49.2
Yes	196	50.8
Perceived personal risk of breast cancer		
Equal/Lower	340	88.1
Higher	46	11.9

While, 34.5% of them know only a fair amount of this fact, and 40.9% know only a little bit about the genes involved in breast cancer. 4.4% of the respondents, however, know almost nothing about the genes that are responsible for breast cancer. In terms of their knowledge about the genetic testing to detect inheritable mutations in breast cancer, 50.8% of them were familiar with the existence of the test while the remaining 49.2% did not know about genetic tests available for mutations detection. About risk factors, 11.9% of the respondents perceived their risk of breast cancer higher as compared to their peers, while 88.1% of them perceived themselves as having equal or lower personal risk of getting breast cancer as compared with their peers. About respondents' awareness about genetic tests available for detecting gene mutations, each participant picks a reason for conducting or avoiding doing the test. The majority of them (67.9%) agreed to get tested to learn about their own risk of getting breast cancer. While (10.4%) of them wanted to know whether they need to do screening tests often, 8.5% of them wanted to know the risk of their child inheriting the gene mutation, 7.3% of them wanted to help with research, 4.4% of them wanted to decide whether surgery is necessary, and the remaining 1.6% agreed to do the test to help them decide whether to have children or not. In terms of their reason to avoid being tested, 40.7% of them refused due to the reason of fear that if the result comes out positive for genetic mutations, it will disrupt their daily lives. While (7.5%) of them were concerned that the results may affect their family members, 7.0% of them fear being discriminated against if the result comes out positive, 3.9% of them were afraid of the test results are not private and confidential, 2.8% of them believed that there are no preventions for cancer, and 0.8% of them just do not trust modern medicine. On the other hand, 36.0% of them answered to have no reason to avoid the genetic test to detect inheritable mutations and the remaining 1.3% has stated other reasons for avoiding the test (Table 3).

Table 3: Awareness of respondents towards genetic test used to detect inheritable mutations

Variables	*n*	%
Reasons for conducting the test		
To Learn child risk	33	8.5
To help research	28	7.3
To know if need test often	40	10.4
To Know Own Risk	262	67.9
To decide if needs surgery	17	4.4
Decide to have children	6	1.6
Reasons to avoid testing		
Fear positive results disrupt daily life	157	40.7
Concern about the effects on family	29	7.5
Believe there is no prevention of cancer	11	2.8
Fear of discrimination if the result is positive	27	7.0
Concern on the confidentiality of test result	15	3.9
Do not trust modern medicine	3	.8
No reason	139	36.0
Others	5	1.3

DISCUSSION

This research provides insights into the level of knowledge, awareness, and interest of genetic testing to detect inheritable mutations among female students of UiTM. The respondents who participated in our research were recruited randomly throughout all faculties in the university. Regarding their demographic information, our sample had a mean age of 21.3 years with a minimum of 19 years old and maximum of 26 years old. Besides, the majority of them were still single (i.e., not married yet), this is mainly because our respondents consist of primarily students or undergraduates, these results were similar to the result of a study done among female students of a university in the United Arab Emirates [6,7]. The majority of the students were Malay which accounted for more than 50% of total respondents. A data from Malaysia Demographic Profile 2014 stated that 50.1% Malaysian population made up of Malay, followed by Chinese, then came Indian and other minorities. The majority of the participants (99%) were singles at an age between 21 and 22. This is because the age of entering university is starting from 19 years old, which is a period where they just finished their foundation studies. Our findings demonstrate that although

95.6% of respondants have some knowledge about gene mutations that are related to breast cancer incidence, 49.2% of them do not know the genetic test that is available to detect these mutations. One of the factors that might have contributed to this is the fact that these respondents consist of students from various faculties taking up medical and/or non-medical courses. Out of the 49.2% of respondents who do not know the genetic test available, 62.2% were from non-medical faculties. The non-medical faculties have a different focus in their syllabus. The in-depth exposure to genetic tests is very unlikely to be included in their course of study. Conversely, 50.8% of the respondents who answered that they were familiar with the genetic tests used for detecting breast cancer gene mutation, were from medical faculties such as the Faculty of Medicine, Dentistry, Pharmacy, and Health Science. Our findings were in line with a study conducted among Italian medical students that highlights a satisfactory level of familiarity with genetic tests due to the frequent exposure in medical practice and engagement in scientific procedures (laboratory procedures etc.) as included in their school curriculum [8]. The majority of our respondents had perceived themselves as having equal or lower risks of breast cancer regardless of having a family history of breast cancer or not. Out of the 43 respondents who mentioned that they have first or second-degree relatives with breast cancer, more than 62.8% perceived themselves as having equal or lower risks of getting breast cancer as compared to their peers, instead of perceiving themselves as possessing higher risks of getting breast cancer. Our finding was contradictory to a study conducted in Australia. It indicates that 50.3% of subjects with a family history of breast cancer perceived themselves as having higher risks [9]. In the USA, where most of their respondents perceived higher risk have a first degree relative with breast cancer [10]. It may denote a lack of knowledge and comprehension of breast cancer risk that can arise hereditarily. The risk is thought to be two to three times greater when the said person is having first-degree relatives with breast cancer due to being more susceptible to inherit genetic mutations [11]. Nevertheless, there was also a report from previous studies that respondents are prone to overestimate their perceived risk of getting breast cancer whether or not they have relatives with breast cancer [12]. The main reason that most of our respondents (67.9%) agreed to do the genetic test was to be reassured of their own risk, while another 10.4% of them wanted to know whether they need to undergo screening tests more often. These results showed that these respondents seemed to be aware of and matured enough to consider their health and well-being; thus, it is not a surprise that many of them prefer the outcomes of the genetic test to benefit themselves. Only 8.5% agreed with them because they wanted to learn about their child's risk of breast cancer. It is sure because only 1.3% of our respondents are married as compared to the other 97.7% who are still single. It can be supported by Bruno *et al*. (2004), who mentioned that the main reason to conduct a genetic test about cancer was to know whether their kid is at the risk of cancer incidence or not. It was due to most of the respondents consist of married women and women having children of their own [13]. Meanwhile, 40.7% of the respondents refused to perform the genetic test because of the fear that the results may disrupt their daily activities and projects. Especially the fact that they are currently undergoing their everyday lives as a full-time student, packed with classes, projects and at the same time needing to cope with the stress that might occur with the situation. However, 36.0% of them stated that there were no specific reasons why they refuse the genetic test; while 7.5% of them were concerned about the effects that might involve their family. This result is in line with the Bruno *et al*. (2004) finding, where the main reason for their respondents refusing the test is due to that their daily life may be affected by the test results. They also emphasized that the respondents lack the comprehension of the limitations and consequences of the test, due to preferring categorical answers rather than personalized ones [13].

Conclusion

Most of the respondents have inadequate knowledge and awareness about breast cancer genetic tests; also, they showed a high level of interest in genetic tests available for breast cancer risk detection.,Educational material and medical services that are specifically dedicated to such information are better to be soon developed. This study provides valuable information to formulate relevant cancer prevention strategies, in line with and scope of health education among undergraduate students.

Acknowledgement

The author thanks the Universiti Teknology MARA for supporting the project.

Conflicting interests

Nothing declared.

Data sharing statement

The datasets analyzed during the current study will be available from the corresponding author on a reasonable request.

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