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ORIGINAL ARTICLE

Risk perception and screening behavior of Filipino women at risk for breast cancer: implications for cancer genetic counseling

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Abstract

The burden and experiences that come with a breast cancer diagnosis in a family impact how women perceive personal cancer risk and pursue preventive strategies and/or early detection screening. Hence, this study sought to understand how Filipino women incorporate their experiences living with a sister diagnosed with early-onset breast cancer to their personal perceived risk and screening behavior. Guided by phenomenological approach of inquiry, a face-to-face, semi-structured interview was conducted with 12 purposively sampled women with a female sibling diagnosed with breast cancer before age 50. Transcripts were analyzed using thematic analysis. Results revealed that the respondents tend to compare themselves with their sister when constructing views of personal cancer vulnerability. The subjective risk is also shaped by their beliefs regarding cancer causation such as personalistic causes, personal theory of inheritance, and locus of control. Their sisters' cancer diagnoses serve as a motivation for them to perform breast self-examination. However, clinical breast examination and screening mammography are underutilized due to perceived barriers such as difficulty allotting time to medical consultation, fear, and lack of finances. Overall, cancer risk perception and screening behavior are important factors that must be addressed during cancer genetic counseling consultations. Better understanding of these factors will aid in the formulation of an effective management plan for at-risk women.

Keywords Early-onset breast cancer · Risk perception · Screening behavior · Genetic counseling

Introduction

Breast cancer is the most common cancer diagnosed among women in 140 of 184 countries (IARC 2013). According to the 2012 report of the GLOBOCAN Project, breast cancer accounts for 25% (1.67 million) of all new cancer cases. Its prevalence has been increasing in both developing and developed countries (Bray et al. 2013). Specifically in the Philippines, breast cancer is the leading cancer site in females. The Department of Health and the Philippine Cancer Society Inc. population-based cancer registries reported an age-standardized incidence rate of 55.1 per 100,000, the highest recorded incidence rate in any Asian population (Ngelangel et al. 1994; Gibson et al. 2009). Parallel to its high incidence is high mortality rate. Twenty-eight percent of cancer deaths among Filipino women are attributed to breast cancer. The national age-standardized mortality rate was estimated at 11.9 per 100,000 women or for every three new cases there was one death (Laudico et al. 2010). It is predicted that breast

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cancer will continue to be the topmost cancer diagnosis in the majority of countries in the upcoming years. The GLOBOCAN Project further predicted that in 2020, there will be an 18.5% and 18.4% increase in the estimated number of new breast cancer cases in the Philippines and worldwide, respectively (IARC 2013). This indicates the need for improving care and service provision targeted at managing diagnosed patients (Bray et al. 2013).

Several risk factors are involved in the etiology and development of breast cancer. Among these, genetic factors are of particular importance (Kleibl and Kristensen 2016). Several epidemiological studies have indicated an increased risk for breast cancer among relatives of an affected individual (NCCN 2017). Furthermore, potential genetic contribution is indicated when there are multiple family members affected, and the pattern is compatible with autosomal dominant inheritance. This is especially concerning when a female presents with clinical features such as early disease onset, tumor recurrence, bilateral tumor development, and presence of rare or minor histopathological diagnoses (Kleibl and Kristensen 2016). These manifestations are potentially due to causative germline mutations in breast cancer susceptibility genes, like the *BRCA1* and *BRCA2*, in hereditary breast cancer syndromes that account for up to 5–10% of all breast cancer cases (Kleibl and Kristensen 2016). The cancer risk in mutation carriers is significantly elevated in comparison to the general population (Berliner et al. 2012; Riley et al. 2011; NCCN 2017).

Only a scant number of studies have examined the risk perception and breast screening behavior of Filipino women who belong in families with a significant history of breast cancer diagnosis. Breast cancer cases among Filipino women are generally diagnosed at later stage because they usually practice therapeutic and diagnostic visits to health care sources rather than preventive health care consultations (Ngelangel and Wang 2002). Hence, this study explores how Filipino women incorporate their experiences living with a sister diagnosed with early-onset breast cancer to their personal perceived risk and screening behavior. Better understanding of the current gap in knowledge can aid in formulating cancer genetic programs and improve services in the Philippines.

Methods

This study utilized phenomenological research design. In this qualitative approach of inquiry, the research process focuses on deciphering the meaning that the respondents have about the phenomenon by enabling them to express their views in ways that are meaningful to them (Brunstrom et al. 2015). The researcher explored the risk perception and screening behavior of the respondents through in-depth and detailed narrations of their experiences living with a sister diagnosed with early-onset breast cancer. The design and the protocol of the study were approved by the University of the Philippines Manila Research Ethics Board (UPMREB 2016-449-01).

Recruitment

The outpatient Breast Care Center (BCC) of the Philippine General Hospital (PGH) was the study recruitment site. The hospital provides oncology services to 20–25% of the population of metropolitan Manila and Rizal province. As a primary government-sponsored tertiary care facility, the BCC PGH also receives referrals from various regions in the Philippines (Matsuda et al. 2002).

The purposive selection and recruitment of the respondents were guided by the following eligibility criteria: (1) female aged 18–50 years old with Filipino ancestry; (2) has a living biological female sibling diagnosed with early stage (stages I–II) breast cancer before age 50, who underwent mastectomy and was undergoing adjuvant chemotherapy during the time of research; (3) no personal history of breast cancer; and (4) can speak Filipino and able to give consent.

The researcher initially wrote a letter to the director of BCC PGH to request access to the list of pre-selected patients. The BCC PGH clinical staff conducted the initial review of patients meeting inclusion criteria. Once access was permitted, the researcher had a daily logbook review to determine the scheduled patients who meet recruitment criteria. The researcher then approached prospective patients during the consultation, and additional assessment and verification regarding their sister's eligibility was conducted. If eligible, the patient's sister was contacted and invited to participate. They were informed about the study information, objectives, and methods. When they gave verbal agreement to participate, the researcher set up an interview date and confirmed the venue that is most convenient for them. The informed consent form was reviewed with a potential respondent, and the signed informed consent was obtained on the day of the interview.

Phenomenological research typically regards three to ten respondents as the sample size until reaching theoretical saturation (Creswell 2014). Thus, the researcher initially recruited six individuals who met the criteria. Additional potential respondents were recruited until the categories or themes were deemed saturated.

Data collection and analysis

Respondents were interviewed in person using a semi-structured interview guide (Table 1). The key interview questions were open-ended, neutral, and sensitive. To establish clear, coherent, and answerable set of questions, pilot testing was conducted initially with two respondents, and the content validation with a genetic counselor, psychologist, and qualitative research method expert.

Table 1 Semi-structured interview guide

1. Can you describe or narrate your experiences living with a sister diagnosed with breast cancer?

Probe:
- What did you feel when you learned that your sister has this condition?
- Why did you feel this way?

2. How do these experiences affect your view of your own health?

Probe:
- Are you worried that you might have the same condition?
- What do you think is your chance of acquiring breast cancer?
- Why do you say so?

3. What do you feel about this chance of acquiring breast cancer?

Probe:
- Why do you feel this way?
- Is there anything that you can do to lower your risk?

4. What breast cancer screening measures have you already done?

Probe:
- Have you heard of breast self-examination, clinical breast examination, and mammography?
- When and how did you do this?
- Why did you do (or not do) this?

Each interview was conducted in areas free from distractions and the respondents were assured of their anonymity, privacy, and confidentiality. The respondents were informed that the study did not intend to provide a breast cancer risk assessment nor promote screening or any procedures. However, if they wished to know about their risk, the researcher would refer them to a genetic counselor for a consultation.

Following informed consent, all the interviews were tape recorded and transcribed. Each transcript was assigned with a pseudonym and stored in a password-protected desktop computer to ensure privacy and confidentiality. For data analysis, the simplified version of Hycner's explication process (as cited in Groenewald 2004) was adapted.

As a validity strategy for qualitative research (Creswell 2014), the thematic analysis started with bracketing the study researcher's subjectivity to clarify preconceptions and prejudgments toward the phenomenon being studied. The study researcher coded each interview for common themes, and redundant units were eliminated. Significant themes were identified using the techniques by Ryan and Bernard (2003).

Study findings and discussion

Study respondents

From January to February 2017, a total of 16 potential respondents were approached to join the study. Four women who initially verbally indicated that they would like to participate had subsequently declined to be interviewed. Their reason for non-participation was not further explored. Theoretical saturation occurred at the eighth in-person interview. Among the 12 respondents who completed their interviews, no one withdrew from the study.

Table 2 summarized the respondent's demographics. Their age ranges from 31 to 50 years old (mean = 44), and the majority were married, Roman Catholic, and have graduated from college. Most respondents were housewives living in an urban area and were earning Php 1000–10,000 (20–200 USD) per month.

Cancer risk perception

Ten out of 12 (83.3%) respondents shared that they are worried about getting breast cancer. In terms of their risk perception, nine (75%) respondents shared that they are "low risk", two (16.7%) replied "I don't know" or "I'm not sure", and one (8.3%) said that she is at "high risk" of acquiring the

Table 2 Demographic information of the respondents (n = 12)

Demographic information	Respondents
Age (years)	Mean age = 44 (range 31–50)
Education	
College graduate	8
College undergraduate	1
Vocational graduate	1
High school graduate	2
Civil status	
Married	8
Single	4
Religion	
Roman Catholic	7
United Methodist Church	2
Born Again Christian	1
Protestant	1
Others	1
Occupation	
Housewife	6
Teacher	3
Company secretary	1
Direct selling business	1
None	1
Residence	
Urban	9
Rural	3
Monthly income	
Php 1000–10,000	7
Php 11,000–20,000	1
Php 20,000 and above	4

disease during her lifetime. From their succeeding responses, the basis for their cancer risk perception emerged and there were two main thematic findings. These are: (1) associating self to sister with breast cancer, and (2) perception on cancer etiology.

Associating self to sister with breast cancer

Seven (58.3%) of the respondents believed that they have a low chance to have breast cancer because they considered themselves "healthier" when compared to their sister. One respondent specifically shared:

> The way my sister deals with stress is kind of different. If she's exhausted, she tends to eat, up to the point where her diet is no longer balanced. She also likes processed and instant food. So it's all about food and fatigue. I am not surprised why she acquired it…But I'm not like that… what I mean is, I am aware of my health. I'm not fond of eating junk foods, unlike her. I seldom eat unhealthy foods. I take good care of my health. –P9

Similarly, six (50%) other respondents associated the basis of cancer risk with their sister's unhealthy food choices, lack of rest, harmful substances from their vices, and exposure to stressful work environment. These findings are congruent to the study findings of Underhill et al. (2012) regarding the risk perception of women at risk for hereditary breast cancer. Women viewed their affected relative's stories as a baseline foundation of the cancer experience when describing beliefs about their breast cancer risk. Then, they compare themselves to the said baseline to conceptualize cancer and form perceptions of their own cancer vulnerability.

Several published studies also reported that experiencing how a family member dealt with their cancer diagnosis serves as the core of risk representation for many women (Spector et al. 2009; Underhill et al. 2012; Pilarski 2009). The theory of genetic vulnerability, for one, describes the influences of family experiences with a hereditary disease on the individual's understanding of genetic information. It suggests that individuals may base their subjective risk perception in comparison to their affected family member's experiences more than objective numeric data (Hamilton and Bowers 2007). Furthermore, living with risk is an ongoing process, initially through living with a relative's experience that, over time, led to a subjective development of one's sense of risk (Chalmers et al. 1996). This process involves three phases: (1) living the breast cancer experience through the affected relative's experience, (2) developing risk perception, and (3) putting risk in its place.

The first phase takes place when a woman indirectly lives the cancer illness through her relative's experience. Resolution allowed the woman to personally separate from her relative's experience and begin to shape an articulation of her own vulnerability to cancer. In the second phase, the woman attempts to articulate her personal vulnerability to breast cancer by assessing the significance of her biological attributes (e.g., family history) and by appraising her own threatening experiences with breast lumps or other bodily abnormalities. In the final phase, the perception of cancer risk is integrated into the woman's sense of self. Cancer risk is acknowledged, and managed mentally and practically by exerting control through cognitive processes and self-care practices (Chalmers and Thomson 1996; Chalmers et al. 1996). On the other hand, d' Agincourt-Canning (2005) hypothesized that family history and subjective experiences create "experiential knowledge" that affects perceptions of cancer risk. It has two types: empathetic knowledge and embodied knowledge. This perceived empathetic knowledge is derived from close association with others going through an experience, while embodied knowledge is derived from personal experience (d' Agincourt-Canning 2005).

Perception on cancer etiology

When respondents were asked about the reasons why they perceive a low risk of acquiring breast cancer, most of them anchored their responses within the context of their beliefs.

"*Bahala na ang Panginoon*" (all are up to God) was one of the responses. Six (50%) respondents believed that only God can dictate whether they will have breast cancer or not.

> I believe that I have a healthier lifestyle. Whatever happens [referring to having a cancer], it's up to him. God knows everything.–P5

According to McBride (2001), most Filipinos believe that sickness is caused by mystical, personalistic, and naturalistic causes. Mystical causes are retribution from ancestors for unfulfilled obligations, whereas personalistic causes are due to "active, purposeful intervention" of another human being, a spirit, or a supernatural entity (Foster 2014, as in cited Abad et al. 2014). Hence, the "*Bahala na ang Panginoon*" shared by the respondents is classified in this etiology (Abad et al. 2014). It is related to common Filipino belief *Kaloob ng Diyos* (God's will) and to the Filipino fatalistic attitude *Bahala na* (come what may).

The belief *Kaloob ng Diyos* takes place when Filipinos tend to attribute all events in his or her life as a gift from God. This core belief promotes coping as it provides personal empowerment and hope (Abad et al. 2014). *Bahala na* attitude, on the other hand, occurs when an individual does whatever he or she can and then resigns to whatever will happen (Tan 2008, as cited in Abad et al. 2014). It highlights strong faith to a higher being as Filipinos commonly resort in surrendering their problems to God (Abad et al. 2014).

Three (25%) of the 12 respondents regarded cancer as a disease that "runs in the family" and further shared that "breast cancer only occurs to one family member per generation" For instance, if their sister already "inherited" breast cancer, chances are, they will not have the disease.

> My mother has 4 siblings and she was the only one who acquired breast cancer. In our case, we are five, all girls; so I believe that she [sister with cancer] will be the first and last among us. –P1

Naturalistic causes include an array of factors from natural events (e.g., thunder, lightning, drafts), or physiologic mechanisms (e.g., excessive stress, incompatible food and drugs, infection, and familial susceptibility) (McBride 2001). As stated, cancer as a disease that "runs in the family" was emphasized. For the perception of "one cancer case per generation", McAllister (2003) stressed that "lay models of inheritance" are common in the society. It often provides an outline to explain the transmission of physical and behavioral traits in the family. If it is linked to the experiences with the disease, the said lay models become "personal theory of inheritance" that can influence someone's risk perception.

Three (25%) of the 12 respondents did not believe that cancer can be passed through generations. They thought that breastfeeding reduces their risk for developing breast cancer. In general, women who have a greater number of menstrual cycles over their lifetime are generally at higher risk of developing breast cancer than those with lower number of cycles (Schneider 2012). Similarly, women who use medical risk-reducing strategies, such as antiestrogen or prophylactic mastectomy reduces their lifetime breast cancer risk (Spector et al. 2009). Asserting these means as personal control over breast cancer is an example of "locus of control". Bottorff et al. (1998) explained that it is one of the cognitive biases that influences risk perception. It occurs when an individual feels that he or she is actively modifying a situation to overcome risk.

Breast cancer screening behavior

Screening for women who are at increased risk of breast cancer due to a family history suggestive of a known genetic predisposition, is different from the general population. In this context, the National Comprehensive Cancer Network (NCCN) recommends a periodic and consistent breast self-examination (BSE) starting at age 18, semi-annual clinical breast examination (CBE) starting at age 25, and a yearly mammogram beginning at age 30 (NCCN 2017).

All of the respondents reported that they have experienced checking their breast through BSE. Eight (66.7%) shared that they conduct BSE occasionally, e.g., "if it dawns on me", whereas three (25%), perform BSE every month, usually around the time of their menstrual period. One (8.3%) respondent claimed that she does it every day while taking a bath.

Five (41.7%) respondents have not had a CBE performed by a physician. Six (50%) have had a CBE once, mostly during their general check-up. One (8.3%) respondent has had a CBE every 6 months as part of their company's health check.

Eleven (91.7%) respondents are yet to pursue a screening mammography. One (8.3%) had a screening mammogram when she sought medical consultation after experiencing breast tenderness. Table 3 summarizes the respondents' breast cancer screening practices.

For the respondents meeting criteria to pursue breast cancer screenings, the study findings indicate that the majority are yet to pursue this recommendation. In a survey conducted in Metro Manila, only 54% had ever done BSE, and, of whom, 27% are only performing BSE nine times out of the recommended 12 monthly exams in a year. In addition, only 37% of the women had ever received a CBE from a physician (Ngelangel and Wang 2002). Multiple studies have also noted that the uptake of screening mammography among Filipino women is between 41 and 71% (Simpson et al. 2015; Maxwell et al. 1997).

The study findings highlighted that the respondents have prior knowledge on the personal utility of breast cancer screening. However, they have inadequate idea on when and how it should be done. Also, most of them have not received any recommendations from a health care provider. Several studies have reported that a major factor of breast cancer screening underutilization is attributed to insufficient physician recommendation (George 2000; Maxwell et al. 1997). Specifically, George (2000) reported that this was a major identified barrier in more than half of the reviewed studies that examined the uptake of screening mammography. This said barrier has also been noted in another study that a physician's recommendation is the most important factor for a Filipino woman in the United States to obtain a mammogram (Maxwell et al. 1997). And, these women further shared their preference to receive mammogram from a health care provider who they regard as the most credible.

Knowledge is a strong predictor of screening behavior (George 2000; Subramanian et al. 2013; Vetter et al. 2016).

Table 3 Breast cancer screening practices of the respondents ($n = 12$)

Breast self-examination (BSE)	Not regular	8
	Regular	4
Clinical breast examination (CBE)	Not done	5
	Once	6
	Regular	1
Screening mammography	Not done	11
	Done	1

Notwithstanding, discrepancies between knowledge and actual practice exist. There are other factors that influence screening utilization (George 2000; Lamyian et al. 2007; Moodi et al. 2012; Obikunle 2016; Subramanian et al. 2013). The second finding echoes the factors influencing the screening behaviors of the participating women. The themes are as follows: (1) sister's cancer diagnosis as a reminder for breast awareness, and (2) perceived barriers to breast cancer screening.

Sister's cancer diagnosis as a reminder for breast awareness

The respondents were driven to perform BSE because of their sister's cancer diagnosis. Eight (66.7%) had recalled how their sister's condition constantly reminds them to check for lumps, masses, or any other abnormal manifestations on their breast. For one respondent, being aware of her breasts means detecting the disease early.

> Since my sister got cancer, I'm more aware to check myself through palpating my breast. If it is inevitable to have similar disease in the future, at least, it would not be as worse as hers because of early detection and treatment.–P10

In both studies by Maheu (2009) and Underhill et al. (2012) regarding the screening behaviors of women at risk for hereditary breast cancer, they concluded that a breast cancer diagnosis in the family served as a reminder for other members to get screened. In this regard, heuristics has been applied to health decision-making because it influences how health information is understood and applied to medical decisions. Availability heuristics, in particular, was observed in this study as the judgments made by the respondents are based on the ease with which associations come to mind (McDowell et al. 2013). Another example is the pursuit of genetic testing based on the salience of information brought about by a recent cancer diagnosis of a relative. This was apparent in a study by McDowell et al. (2013) about the relationship of family history on cognitive heuristics, risk perception, and prostate cancer screening. Their results noted that men with a family history of prostate cancer had greater access to information and experience about the disease that contributed to their judgments about screening.

Perceived barriers to breast cancer screening

This theme enumerates the reasons why most respondents did not engage in pursuing breast cancer screening such as CBE and mammography. Primarily, "It is not a priority" and "I have no time" are the most frequent responses because of their hectic duties at home. Accounts from the respondents have disclosed their roles as primary caregivers of their sister with breast cancer. Thus, taking care of the sister was considered to be a priority and it consumed most of their time. Difficulty allotting time is a common barrier for breast cancer screening (Ngelangel and Wang 2002; Wu and Bancroft 2006). Most Filipino women find it inconvenient to schedule medical appointments, especially to those who work 5 to 6 days a week (Wu and Bancroft 2006). Despite the fact that half of the respondents are housewives, they tend to work more than full time because of their family responsibilities. As such, they perceived screening as a competition for their priority as a caregiver.

Attitudes toward screening also hindered the uptake of breast cancer screening services. Fear, especially of mammogram, was evident because it is commonly associated with unpleasant experiences. According to Wu and Bancroft (2006), the said screening procedure is always conceived as a complex medical examination related to discomfort, pain, and uneasiness. In addition, most Filipino women are not comfortable being touched or exposing their own bodies.

Lastly, there is a challenge when accessing screening services because of the underlying financial burden. As one respondent verbalized "*We don't have enough money. That's the number one reason.*" Filipino women report reasons such as financial barriers for transport and medical expenses (Ngelangel and Wang 2002). More often than not, medical procedures like mammograms are also considered to be a luxury because of the expensive cost (Wu and Bancroft 2006). Breast mammography typically costs Php 2000.00 to 3500.00 (USD 40.00 to 70.00) and is mostly accessible in urban or metropolitan areas. The utilization of medical services in the Philippines is generally hampered by poverty as a huge proportion of Filipinos are living below the poverty line (de Torres 2002). Indeed, government and community support, such as health insurance coverage and accessible clinic locations can increase screening utilization (Lamyian et al. 2007).

Cancer genetic counseling implications

Cancer genetic risk assessment is the process of identifying and counseling individuals at risk for familial or hereditary cancer (Trepanier et al. 2004). Cancer genetic risk assessment determines whether the family history is suggestive of sporadic, familial, or hereditary cancer and quantifies cancer risks in individuals and their biological relatives. The study respondents have biological female siblings with early-onset breast cancer, which according to the latest guidelines of National Society of Genetic Counselors (Berliner et al. 2012) and National Comprehensive Cancer Network (2017), are considered to be at increased risk for acquiring breast cancer due to strong family history and included among the referral criteria for cancer risk assessment and genetic counseling.

Cancer genetic counseling aims to educate individuals and their family about the chance of developing cancer, and help them derive personal meaning from cancer genetic information. It is important to empower individuals to make educated, informed decisions about genetic testing, cancer screening and cancer prevention (Trepanier et al. 2004). Genetic counselors play a vital role in understanding and integrating genetic, medical, and psychological information to promote informed decision-making (Geller et al. 2007, as cited in Trepanier et al. 2004).

The first step of cancer risk assessment and counseling begins with collection of personal and family medical history (Trepanier et al. 2004). Taking an accurate and complete family history is considered to be one of the most important skills acquired by genetic counselors (Schneider 2012). Not only do they uncover cancer diagnoses in one's family but also explore other factors that might affect the understanding toward the genetic information. Schneider (2012) suggested that one of the essential considerations in this step of genetic counseling is hearing the patient's family stories. Genetic counselors might be enlightened about the family's insights of the cancer history, awareness of a genetic etiologies, use of culture and traditions to explain the cancer in the family, their level of trust toward the medical system, uptake in cancer screening regimens, and the like. Upon exploring the experiences of the respondents, it has been noted that women living with a sister with breast cancer tend to associate their risk perception and screening behaviors with the encounters they had with their affected sibling. Moreover, issues relevant for the psychosocial assessment, such as the women's response to the diagnosis, emerging roles and responsibilities, and coping mechanisms as well as the family's dynamics toward the diagnosis were also discovered.

After collecting and interpreting medical histories, genetic counselors convey risks to their patients. Genetic counseling can provide the numerical risk estimates for women at risk for hereditary breast cancer; however, the patients still make use of their own cognitive biases and emotions to determine what the risk means to them (Pilarski 2009). The study findings noted that the respondents have a low subjective risk due to their beliefs on cancer causation. Hence, it is important to assess a patient's beliefs about cancer etiology before presenting numerical risk information (Trepanier et al. 2004). Abad (2012) proposed the need for the genetic counselors practicing in the Philippines to use explanatory models of illness, e.g., Kleinman's framework (Table 4). This will provide an opportunity for genetic counselors to obtain information about the patient's understanding and perception of genetic risks and overall acceptance of the disease (Abad 2012).

When the beliefs toward the disease are identified and acknowledged, genetic counselors will have an opportunity to address the misconceptions associated with the breast cancer diagnosis in the family. Genetic education provides additional understanding about the natural history and biomedical etiologies of cancer (i.e., interplay of heredity and environment) in a language that can be easily understood. Furthermore, this also calls for health policy-making in the country to improve the genetic literacy of the general public as there is a minimal to non-existent understanding of genetic concept among most Filipinos (Abad 2012).

Table 4 Kleinman's explanatory framework

1. What do you think has caused your problem?
2. Why do you think it started when it did?
3. What do you think your sickness does to you and how does it work?
4. How severe is your sickness and will it have a short or long course?
5. What kind of treatment do you think you should receive?
6. What are the most important results you hope to receive from this treatment?
7. What are the chief problems your sickness has caused for you?
8. What do you fear most about your sickness?

Another key role of genetic counseling is to guide and influence the patient regarding risk-reducing behaviors (Pilarski 2009). Findings of this study show the underutilization of breast cancer screening due to the perceived barriers. Genetic counselors can educate women at risk for acquiring breast cancer about the three recommended modalities of screening. As mentioned, some perceived screening as an expensive, painful, and unpleasant procedure thus eliciting fear and delayed consultation. In partnership with other healthcare providers, genetic counselors should promote awareness about the purpose and importance of screening for breast cancer for detecting the disease in its early stages. Emphasis can be given to the benefits of breast self-examination and monthly clinical breast examination by a nurse, midwife, or public health physician because these two preventive measures are still the most cost-effective strategies in the local setting especially in rural areas (Ngelangel and Wang 2002).

Nonetheless, high level of anxiety may be introduced to at-risk women because of the inaccessibility of more standard screening procedures such as mammography or breast ultrasound. Genetic counselors should be aware of other possible options to address this issue such as referral to social services of the nearest tertiary government hospital for financial assistance. Free consultation to interpret the results and regular check-ups can also be availed in the same institution. It is recommended to implement public health lectures to educate those residing in rural areas through the local health units.

It is noteworthy to mention that the interviewed respondents did not discuss the possibility of pursuing genetic testing. This might be due to the limited delivery of genetic services and testing in the country (Padilla and de la Paz 2012). Further research about the acceptability as well as the ethical, legal, and social implications of genetic testing among the Filipino population should be explored. Promotion of genetic counseling as a growing medical service in the country is

indicated as well. Health care practitioners (e.g., oncologists, surgeons, oncologic nurses) should be cognizant about the referral criteria for cancer genetic counseling to address the needs of those who are at risk for hereditary cancer syndromes.

In summary, understanding risk perception is imperative in the context of cancer genetic counseling. It is associated with the extent whether someone utilizes preventive services and their compliance to screening recommendations. It is paramount for genetic counselors to address these factors in order to be effective in their genetic counseling consultations with at-risk women as it influences communication with at-risk family members.

Study limitations

There were only 12 women who provided informed consent to participate in this study. With recall bias, the results are not generalizable to all the women with a biological female sibling diagnosed with early-onset breast cancer. Variations of the experiences may be observed because of the nature of purposive sampling. This study only included those with no personal history of breast cancer. There may be different responses from women who previously had a cancer diagnosis. Furthermore, there is a limited representation of the experiences from at-risk women who come from distant rural areas and those who seek consultation and treatment from a private hospital due to the study setting. Further research is recommended to explore the risk perception and screening behavior of Filipino women.

Conclusion

In this study, a woman's experience of having a sister with early-onset breast cancer impacts both her risk perception and engagement in cancer screening. The results demonstrate the significance to further recognize the factors influencing the meaning of a woman's perceived personal breast cancer risk. Genetic counselors, along with the healthcare team, should increase efforts in promoting the importance of genetic counseling and breast cancer screening among at-risk Filipino women.

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Compliance with ethical standards

Conflict of interest John Benedict Lagarde, Mercy Laurino, Michael San Juan, Jaclyn Marie Cauyan, Ma-Am Joy Tumulak, and Elizabeth Ventura declare that they have no conflict of interest.

Human studies and informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

Animal studies No animal studies were carried out by the authors for this article.

References

Abad PJ (2012) Explanatory models of illness may facilitate cultural competence in genetic counseling. J Genet Couns 21:612–614. https://doi.org/10.1007/s10897-012-9487-9

Abad PJ, Tan M, Baluyot MM, Villa A, Talapian GL, Reyes ME et al (2014) Cultural beliefs on disease causation in the Philippines: challenge and implications in genetic counseling. J Community Genet 5: 399–407. https://doi.org/10.1007/s12687-014-0193-1

Berliner JL, Fay AM, Cummings SA, Burnett B, Tillmanns T (2012) NSGC practice guideline: risk assessment and genetic counseling for hereditary breast and ovarian cancer. J Genet Counsel 22(2): 155–163

Bottorff J, Ratner P, Johnson J, Lovato C, Joab S (1998) Communicating cancer risk information: the challenges of uncertainty. Patient Educ Couns 33:67–81. https://doi.org/10.1016/S0738-3991(97)00047-5

Bray F, Ren J-S, Masuyer E, Ferlay J (2013) Global estimates of cancer prevalence for 27 sites in the adult population. Int J Cancer 132: 1133–1145. https://doi.org/10.1002/ijc.27711

Brunstrom K, Murray A, McAllister M (2015) Experiences of women who underwent predictive BRCA 1/2 mutation testing before age 30. J Genet Couns 25:90–100. https://doi.org/10.1007/s10897-015-9845-5

Chalmers K, Thomson K (1996) Coming to terms with the risk of breast cancer: perceptions of women with primary relatives with breast cancer. Qual Health Res 6:256–282. https://doi.org/10.1177/104973239600600207

Chalmers K, Thomson K, Degner L (1996) Information, support and communication needs of women with a family history of breast cancer. Cancer Nurs 19:204–213. https://doi.org/10.1097/00002820-199606000-00007

Creswell JW (2014) Research design: qualitative, quantitative and mixed methods approaches, 4th edn. SAGE Publications, Thousand Oaks

d' Agincourt-Canning L (2005) The effect of experiential knowledge on construction of risk perception in hereditary breast/ovarian cancer. J Genet Couns 14:55–69. https://doi.org/10.1007/s10897-005-1500-0

de Torres S (2002) Understanding persons of Philippine origin: a primer for rehabilitation service providers. Center for International Rehabilitation Research Information and Exchange, New York

George S (2000) Barriers to breast cancer: an integrative review. Health Care Women Int 21(1):53–65. https://doi.org/10.1080/073993300245401

Gibson L, Hery C, Mitton N, Gines-Bautista A, Parkin DM, Ngelangel C, Pisani P (2009) Risk factors for breast cancer among Filipino women in Manila. Int J Cancer 126:515–521. https://doi.org/10.1002/ijc.24769

Groenewald T (2004) A phenomenological research design illustrated. Int J Qual Methods 3:42–55. https://doi.org/10.1177/160940690400300104

Hamilton RJ, Bowers BJ (2007) The theory of genetic vulnerability: a Roy model exemplar. Nurs Sci Q 20:254–264. https://doi.org/10.1177/0894318407303127

International Agency for Research on Cancer (2013) Press release no. 233 latest world cancer statistics, global cancer burden rises to 14.1

million new cases in 2012: marked increased in breast cancer must be addressed. World Health Organization, Geneva

Kleibl Z, Kristensen V (2016) Women at high risk of breast cancer: molecular characteristics, clinical presentation and management. Breast 28:136–144. https://doi.org/10.1016/j.breast.2016.05.006

Lamyian M, Hydarnia A, Ahmadi F, Faghihzadeh S, Aguilar-Vafaire M (2007) Barriers to and factors facilitating breast cancer screening among Iranian women: a qualitative study. East Mediterr Health J 13(5):1160–1169. https://doi.org/10.26719/2007.13.5.1160

Laudico A, Medina V, Mirasol-Lumague MR, Mapua C, Redaniel MT, Valenzuela F, Pukkala E (2010) 2010 Philippine cancer facts and estimates. Philippine Cancer Society, Inc., Manila

Maheu C (2009) Implications of living with a strong family history of breast cancer. Can J Nurs Res 41(2):100–112

Matsuda ML, Liede A, Kwan E, Mapua C, Cutiongco EM, Tan A et al (2002) BRCA1 and BRCA2 mutations among breast cancer patients in the Philippines. Int J Cancer 98:596–603. https://doi.org/10.1002/ijc.10194

Maxwell A, Bastani R, Warda U (1997) Breast cancer screening and related attitudes among Filipino-American women. Cancer Epidemiol Biomark Prev 6:719–726

McAllister M (2003) Personal theories of inheritance, coping strategies, risk perception and engagement in hereditary non-polyposis colon cancer families offered genetic testing. Clin Genet 64:179–189. https://doi.org/10.1034/j.1399-0004.2003.00133.x

McBride M (2001) Health and health care of Filipino American elders. Retrieved from Stanford Geriatric Education Center: http://www.stanford.edu/group/ethnoger/filipino.html

McDowell ME, Occhipinti S, Chambers SK (2013) The influence of family history of cognitive heuristics, risk perception and prostate cancer screening behavior. Health Psychol 32:1158–1169. https://doi.org/10.1037/a0031622

Moodi M, Rezalian M, Sharifirad G-R (2012) Determinants of mammography screening behavior in Iranian women: a population-based study. J Res Med Sci 17(8):750–759

National Comprehensive Cancer Network (2017) NCCN Clinical Practice Guidelines in Oncology Genetic/Familial High Risk Assessment: Breast and Ovarian Version 2.2017. National Comprehensive Cancer Network

Ngelangel C, Wang EH (2002) Cancer and the Philippine Cancer Program. Jpn J Clin Oncol 32:552–561. https://doi.org/10.1093/jjco/hye126

Ngelangel CA, Lacaya LB, Cordero C, Laudico A (1994) Risk Factors for Breast Cancer among Filipino Women. Philipp J Intern Med 32(5):231–236

Obikunle A (2016) Barriers to breast cancer prevention and screening among African American women. Retrieved 8 25, 2016, from http://scholarworks.waldenu.edu/dissertations

Padilla CD, de la Paz EM (2012) Genetic services and testing in the Philippines. Journal of Community Genetics 4:399–411. https://doi.org/10.1007/s12687-012-0102-4

Pilarski R (2009) Risk perception among women at risk for hereditary breast and ovarian cancer. J Genet Couns 18:303–312. https://doi.org/10.1007/s10897-009-9227-y

Riley B, Culver J, Skrzynia C, Senter L, Peters J, Costalas J et al (2011) Essential elements of genetic cancer risk assessment, counseling and testing: updated recommendations of the National Society of Genetic Counselors. J Genet Couns 21:151–161. https://doi.org/10.1007/s10897-011-9462-x

Ryan G, Bernard H (2003) Techniques to identify themes. Field Methods 15(1):85–109. https://doi.org/10.1177/1525822x02239569

Schneider K (2012) Counseling about cancer: strategies for genetic counseling, 3rd edn. Wiley, Hoboken

Simpson J, Briggs K, George R (2015) Breast cancer amongst Filipino migrants: a review of the literature and ten-year institutional analysis. J Immigr Minor Health 17:729–736. https://doi.org/10.1007/s10903-015-0168-2

Spector D, Mishel M, Skinner CS, DeRoo L, VanRiper M, Sandler D (2009) Breast cancer risk perception and lifestyle behaviors among white and black women with a family history of the disease. Cancer Nurs 32(4):299–308. https://doi.org/10.1097/ncc.0b013e31819deab0

Subramanian P, Oranye NO, Masri AM, Taib AN, Ahmad N (2013) Breast cancer knowledge and screening behavior among women with a positive family hitsory: a cross sectional study. Asian Pac J Cancer Prev 14:6783–6790. https://doi.org/10.7314/apjcp.2013.14.11.6783

Trepanier A, Arhens M, McKinnon W, Peters J, Stopfer J, Grumet SC et al (2004) Genetic cancer risk assessment and counseling: recommendations of the National Society of Genetic Counselors. J Genet Couns 13:83–114. https://doi.org/10.1023/b:jogc.0000018821.48330.77

Underhill M, Lally R, Kiviniemi M, Murekeyisioni, Dickerson S (2012) Living my family's story: identifying the lived experiences in healthy women at risk for hereditary breast cancer. Cancer Nurs 35(6):493–504. https://doi.org/10.1097/ncc.0b013e31824530fa

Vetter L, Keller M, Bruckner T, Golatta M, Eismann S, Evers C et al (2016) Adherence to the breast cancer surveillance program for women at risk for familial breast and ovarian cancer versus overscreening: a monocenter study in Germany. Breast Cancer Res Treat 156:289–299. https://doi.org/10.1007/s10549-016-3748-5

Wu T-Y, Bancroft J (2006) Filipino American women's perceptions and experiences with breast cancer screening. Oncol Nurs Forum 33:71–78. https://doi.org/10.1188/06.onf.e71-e78