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ABSTRACT

An important part in the effort to prevent, treat, and cure breast cancer is research done with healthy breast tissue. The Susan G. Komen for the Cure Tissue Bank at Indiana University Simon Cancer Center (KTB) encourages women to donate a small amount of healthy breast tissue and then provides that tissue to researchers studying breast cancer. Although KTB has a large donor base, the volume of tissue samples from Asian women is low despite prior marketing efforts to encourage donation among this population. This study builds on prior work promoting breast cancer screenings among Asian women by applying constructs from the Health Belief Model (HBM) and the Integrated Behavioral Model (IBM) to investigate why Asian-American women are less inclined to donate their healthy breast tissue than non-Asian women and how this population may be motivated to donate in the future. A national online survey ($N = 1,317$) found Asian women had significantly lower perceived severity, some lower perceived benefits, and higher perceived barriers to tissue donation than non-Asian women under HBM and significantly lower injunctive norms supporting breast tissue donation, lower perceived behavioral control, and lower intentions to donate under IBM. This study also compares and discusses similarities and differences among East, Southeast, and South Asian women on these same constructs.

The Susan G. Komen for the Cure Tissue Bank at the IU Simon Cancer Center (KTB) is "the only repository in the world for normal breast tissue and matched serum, plasma and DNA" (KTB, 2011). Women are encouraged to donate a small amount of healthy breast tissue through an in-office, minimally invasive surgical procedure. The donated tissue is provided to researchers studying breast cancer. To date, nearly 8,000 women have donated tissue. Yet, despite aggressive efforts by staff at KTB to diversify their donor pool (e.g., targeting work/leisure sites with diverse populations, diversifying visual materials, and community outreach), tissue samples remain overwhelmingly homogenous with 75% of the samples from White/Caucasian women, 17% from Black/African-American women, and only 8% from any other ethnic/racial group.

While Asian and Asian-American women represent just 3% of samples in the KTB tissue bank, Asians comprise more than 5% of the U.S. population and, in fact, are the fastest-growing race or ethnic group in the United States (Bernstein, 2013). Given the duality of growing Western population and commensurate increasing breast cancer risk, it is important to investigate novel opportunities to increase the reach of the KTB into the growing U.S. Asian community. This paper will present an overview of breast cancer incidence and risk factors for Asian Americans and then discuss two health behavior theories that provide insights into how the issue of breast tissue donation may be considered among this population and sub-populations, such as East, South, and Southeast Asians. It

is important to note that while Asian Americans share some cultural values and practices that may contribute to health beliefs (Kim, Yang, Atkinson, Wolfe, & Hong, 2001), the need to better understand differences among Asian sub-populations is critical to effective health communication efforts.

Breast Cancer Among Asian Americans

Nearly a quarter of a million women in the United States are diagnosed with breast cancer annually (American Cancer Society, 2014a), and 40,000 U.S. women will die from breast cancer (American Cancer Society, 2014b). But this is not an equal opportunity affliction. Older women are at much greater risk, as are women born in Western countries (Ziegler et al., 1993). Globally, there are enormous disparities in incidence and survival (Youlden et al., 2012). Traditionally, East Asian women, particularly from China and Japan, have been at lower breast cancer risk than women born in the West, but research has long found that women who move from the East to the West face an increase in their risk (Ziegler et al., 1993). In fact, cancer is the leading killer of Asian Americans, and breast cancer is the most-diagnosed malignancy among Asian-American women. Cancer incidence and mortality are also increasing steadily in South Korea (Park, Kim, Kang, Jung, & Yoo, 2011; Wu, Lin, Chen, & Jung, 2014). Predictive factors include how many ancestors are from the West and how long these women have lived away from home; breast cancer risk nearly doubles among Asian

women who have lived in the West for a decade or more and incidence rates increase as much as 4% per year among Chinese, Japanese, Filipina, and Korean women living in the West (Gomez et al., 2011). Poverty, which predicts late presentation and poor outcomes in breast cancer, is also a factor among Vietnamese women in the West (Donnelly, 2006).

The same pattern of increased risk holds for women from South Asia, such as India and Pakistan, and these women also consider themselves to be at lower susceptibility to breast cancer than their peers in the West (Poonawalla, Goyal, Mehrotra, Allicock, & Balasubramanian, 2014) and other ethnicities (Berry et al., 2016). Also, while the number of years living in the United States predicts increased susceptibility, it also predicts an increase in cancer risk awareness and self-efficacy among Pakistani and other Muslim women living in the United States (Hasnain, Menon, Ferrans, & Szalacha, 2014).

Three factors exacerbate this increased risk in Asian-American women: a lack of awareness that they are at higher susceptibility, a lack of knowledge of and cultural discomfort with resources, like genetic testing and screenings (Glenn, Chawla, & Bastani, 2012; Kaplan et al., 2012). On the other hand, the longer a woman from Asia lives in the United States, the more likely she is to adopt western breast cancer screening conventions (Hasnain et al., 2014; Lee-Lin, Menon, Leo, & Pedhiwala, 2013). It is thought that this belief in a low incidence rate reduces Asian women's perceived risk and severity, which blunts benefits and increases barriers. Additionally, some Asian cultural traditions that have been shown to hinder breast cancer screening efforts may also be relevant in the context of donating healthy breast tissue, such as Asian women's concern for maintaining expectations of modesty, which manifests as an unwillingness to show their breasts to others (Ahmadian & Abu Samah, 2013). Differences in organ donation behaviors and beliefs may also be relevant as research indicates that minorities, particularly Asian Americans, have a reluctance toward organ donation (Cheung, Alden, & Wheeler, 1998). Compared to White Americans on the issue of organ donation, Asian Americans reported a lower sense of responsibility toward the general community and more negative attitudes toward organ donation (Cheung et al., 1998).

Theoretical Frameworks: Health Belief Model

One of the most commonly used theories in health behavior change is the Health Belief Model (HBM) (Champion & Skinner, 2008). It has been applied to linking attitudes to intended behavior on health issues from the mundane (tooth brushing) to the critical (methamphetamine abuse) and is a well-established guide for communicators who are interested in increasing prosocial health behaviors (Richards, 2014; Walker, Steinfort, & Keyler, 2015). This model was chosen based on formative research with interview participants about weighing benefits and barriers and also based on a literature review of cultural impacts on health decision making, which suggest that both East and South Asian women may not believe they are as susceptible to breast cancer— low perceived susceptibility has been linked with low participation in breast cancer screening behaviors (Lee, Stange, & Ahluwalia, 2015; Parsa, Kandiah, Abdul Rahman, & Zulkefli, 2006; Poonawalla et al., 2014).

Perceived susceptibility is often the most predictive variable with regard to preventive health steps, like mammography; however, barriers have also been an important predictive factor (Janz & Becker, 1984). Barriers to breast cancer screening (e.g., mammography, clinical breast exams, breast self-examination) among minority women have included cultural embarrassment, language differences, a fear of cancer, and concern about the outcome if diagnosed (Austin, Ahman, McNally, & Stewart, 2002). Perceived barriers were higher among Korean women who had never had breast screening (Han, Williams, & Harrison, 2000). More contemporary research has found HBM to be inconsistent—more predictive of breast cancer screening among middle-aged women than younger women, for example. However, this finding supports the link between perceived risk and likelihood to pursue screening or to take other health action (Yarbrough & Braden, 2008). More importantly to the present study, Hispanic and Asian women have been shown to believe they are at lower risk of breast cancer, which impeded their perceived risk and the need for screening (Austin et al., 2002; Poonawalla et al., 2014). Finally, while there is a wealth of literature on Asian women regarding breast cancer screening and treatment, as well as large organ donation, there is a dearth of comparative literature contrasting sub-groups within this population, such as East, Southeast, and South Asians, on these issues or any specifically related to small tissue donation.

The HBM can help explain and predict health behaviors by measuring (and then later through messages appealing to) the following health beliefs: perceived susceptibility (likelihood of breast cancer for self and close others), perceived severity (how serious is breast cancer), perceived benefits (pros of donating healthy breast tissue), perceived barriers (cons of donating healthy breast tissue), and self-efficacy (confidence that she could donate if she wanted to). Once perceived barriers and benefits are established, there arises a need for cues to action, which may include exposure to a media message promoting healthy breast tissue donation. Based on the HBM, the following hypotheses are presented:

H1: Asian women will report (a) lower susceptibility beliefs about breast cancer, (b) lower severity beliefs about breast cancer, (c) lower perceived benefits of healthy breast tissue donation, and (d) higher perceived barriers to donating healthy breast tissue than non-Asian women.

RQ1: How do East, Southeast, and South Asian women differ on the constructs of the Health Belief Model, including (a) susceptibility beliefs about breast cancer, (b) severity beliefs about breast cancer, (c) perceived benefits of healthy breast tissue donation, and (d) perceived barriers to healthy breast tissue donation?

Theoretical Frameworks: Integrated Behavioral Model

The other theoretical foundation of our research is the Integrated Behavioral Model (IBM), which is a set of constructs based on other theories (e.g., Theory of Planned Behavior, Ajzen, 1985) that have been shown to be key determinants of health behavior (Montano & Kasprzyk, 2015). This theory is most likely to apply when people are making

thought-out decisions about engaging or abstaining from a health behavior. IBM is a model developed and recommended by behavioral theorists from a workshop convened by the National Institute of Mental Health (Fishbein et al., 1992). IBM includes constructs mainly from the Theory of Planned Behavior and the Theory of Reasoned Action but also from Social Cognitive Theory, the Theory of Interpersonal Behavior, and the Health Belief Model (Montano & Kasprzyk, 2015). According to IBM, behavioral intention is the strongest predictor of behavior (Fishbein & Yzer, 2003). Within IBM, behavioral intention is determined by attitude (beliefs that donating healthy breast tissue will lead to positive outcomes), affect (emotional responses to the idea of the donating healthy breast tissue), social influence (injunctive and descriptive norms related to breast tissue donation), environmental factors and control beliefs (beliefs how easy/difficult donating would be), and perceived risk (perceived susceptibility and severity of breast cancer) (Montano & Kasprzyk, 2015).

Although IBM as a whole is relatively new, the main theory it is derived from, the Theory of Planned Behavior, has been successfully applied in contexts around the periphery of the present study, such as intent to consider future organ donation (Bae & Kang, 2008; Bresnaham et al., 2007). Researchers also found that supportive social influences is strongly linked to breast cancer screening intentions for Korean women (Kim, 2002). East Asian culture, in particular, has been linked to the practice of being highly aware and responsive to social contexts compared to European culture (English & Chen, 2007). Based on comments made by formative research interview participants and relevant literature, this study focused on the constructs of behavioral intention to donate, social influences related to donation, and donation control beliefs. Perceived risk was measured within the HBM hypotheses, and attitudes and affect were not measured as this study is not intended to test the entire model but rather used IBM as a guide to which constructs may be important to measure. This study also excluded descriptive norms because of the rarity of healthy breast tissue donation. It is likely that little variance exists for descriptive norms about how many of their friends, family, or peers are donating. The following hypotheses are based on the IBM:

H2: Asian women will report (a) lower injunctive norms about breast tissue donation, (b) lower perceived behavioral control related to donating healthy breast tissue, and (c) lower donation-related intentions than non-Asian women.

RQ2: How do East, Southeast, and South Asian women differ on the constructs of the Integrated Behavioral Model, including (a) injunctive norms about breast tissue donation, (b) perceived behavioral control related to donating healthy breast tissue, and (c) donation-related intentions?

Methodology

An online survey managed by the researchers was conducted among participants who were recruited nationwide with oversampling of the Asian population by a U.S. research company. Data was collected from April 8 through April 30, 2014. The online questionnaire took approximately 20 minutes to complete. Participants were told the survey would be about healthy breast tissue donation but that no prior knowledge on this issue was expected or necessary. Since it was expected that very few participants would be familiar with healthy breast tissue donation or the Komen Tissue Bank, all participants were shown a screen that could not be skipped for at least 20 seconds with information about breast tissue donation and the standard pitch KTB includes in their messaging prior to completing the questionnaire:

> The Komen Tissue Bank (KTB) at Indian University is the only repository in the world for normal breast tissue and matched serum, plasma and DNA. It is kept as a resource for researchers studying breast cancer. The Tissue Bank gets healthy breast tissue from women who volunteer to donate in a procedure that is similar to a biopsy. Cancer patients and their families and friends have been actively participating in fundraising and awareness campaigns for many years. Collecting specimens from women who have had breast cancer and from those who have not had breast cancer enables these donors to give a gift to science that is unprecedented. Even though these donors will not benefit directly from their donation of tissue, they are providing an invaluable resource to enable research to maximize its potential today and in generations to come.

The mean time spent reading the information was 92.7 seconds (SD = 790.2). This study was approved by the university's institutional review board.

Participants

The survey yielded a robust sample of diverse women (N = 1,317), including 407 (30.9%) who identified themselves as Asian or Asian-American and 18 more who self-identified as mixed race including Asian (n = 425). Of the total respondents, 41.0% identified as White/Caucasian 21.0% as Black/African American, 3.1% as Hispanic, and less than 1% each as Pacific Islander, mixed race (non-Asian), or Native American. A total of 2,877 began the survey instrument. After controlling for response bias, speed respondents, and noncompletes, we arrived at a total of 1,317 complete responses for a completion rate of 45.8%. The mean age was 43.7 (SD = 16.5) with 76.3% born in the United States and only 8.2% responding that they thought they may have heard of the KTB before the study. Of the sample, 66.3% had known someone, had a close friend or family member who had been diagnosed with breast cancer (59.8% of Asians and 69.4% of non-Asians). Based on ethnic differences we perceived in interviews with previous donors, and the pattern of disparities in donation history to KTB, we also asked people who identified as Asian to further select the country or regional group that describes them (text responses were also allowed). Based on ethnic origin selection, three categories of Asian ethnicity were created, which are consistent with the U.S. federal designations: East Asian (Chinese, Japanese, Korean, Mongolian, Okinawan, Taiwanese), Southeast Asian (Bornean, Bruneian, Burmese, Cambodian, Celebesian, Filipino, Hmong, Javanese, Indonesian, Laotian, Malaysian, Montagnard, Singaporean, Thai, Vietnamese), and South Asian (Afghan, Bangladeshi, Bhutanese, Indian, Maldivian, Nepalese, Pakistani, Sri Lankan, Tibetan). Among the Asian respondents,

49.4% were East Asians, 22.6% were Southeast Asians, 24.0% were South Asians, and 4.0% chose not to identify a specific ethnic origin.

Measures

To measure the constructs of Health Belief Model, we followed an established model applying perceived susceptibility, benefits, and barriers to mammography, the closest analog to breast tissue donation (Champion, 1999).

Perceived Susceptibility

This variable referred to a participant's belief about her likelihood of having breast cancer. Four items used a seven-point Likert-type scale from "Strongly Disagree" to "Strongly Agree" (e.g., "It is likely that I will get breast cancer"). Items were averaged to create a composite measure with higher indicating greater perception of susceptibility ($\alpha = .90$).

Perceived Severity

This variable measured how serious or concerning breast cancer is to a participant. Four items used a seven-point Likert-type scale from "Strongly Disagree" to "Strongly Agree" (e.g., "I often worry about getting breast cancer" and "Breast cancer is one of my biggest health concerns"). Items were averaged to create a composite measure with higher indicating greater perception of susceptibility ($\alpha = .82$).

Perceived Benefits

This variable referred to how important different motivations are for each participant related to the positive outcomes or benefits of donating her healthy breast tissue. Based on formative interviews, researchers knew there were likely to be separate benefit categories and thus created five mutually exclusive sub-scales for benefits from 13 items, using a seven-point Likert-type scale from "Not At All Important" to "Extremely Important."

Benefit Sub-Scale: Protecting Loved Ones. Three items were averaged to create a composite measuring how important the benefit of being able to protect their loved ones from breast cancer in the future is as a motivation to donate their healthy breast tissue (e.g., "Donating could help me protect my daughters/sisters from breast cancer in the future") ($\alpha = .83$).

Benefit Sub-Scale: Honoring Survivors. Three items were averaged to create a composite measuring how important the benefit of being able to honor a friend or relative who had/has breast cancer is as a motivation to donate their healthy breast tissue (e.g., "Donating could let me honor a friend with cancer") ($\alpha = .85$).

Benefit Sub-Scale: Helping Research. Four items were averaged to create a composite measuring how important the benefit of contributing to the success of breast cancer research is as a motivation to donate their healthy breast tissue (e.g., "If I thought the tissue would have real value to researchers" and "Donating might let me help scientists advance research") ($\alpha = .92$).

Benefit Sub-Scale: Feeling Empowered. Two items were averaged to create a composite measuring how important the benefit of feeling like they are personally empowered to make a difference in the fight against breast cancer is as a motivation to donate their healthy breast tissue (e.g., "Donating gives me something I can actually do to fight breast cancer") ($r = .69$, $p < .001$).

Benefit Sub-Scale: Representing Ethnicity. One item asked the importance of helping their ethnicity to be represented is as a motivation to donate (i.e., "Because it's important for my ethnic group to be represented").

Perceived Barriers

This variable measured how important different reservations are for each participant related to the negative outcomes or barriers of donating her healthy breast tissue. Based on formative interviews, researchers knew there were likely to be separate barrier categories and thus created three mutually exclusive sub-scales for barriers from ten items, which used a seven-point Likert-type scale from "Not At All Important" to "Extremely Important."

Barriers Sub-Scale: Discomfort or Pain. Four items were averaged to create a composite measuring how important the barrier of concern about pain, discomfort, or appearance is as a reservation to donating their healthy breast tissue (e.g., "Donating healthy breast tissue might be uncomfortable or hurt" and "How my breasts will look afterwards") ($\alpha = .74$).

Barriers Sub-Scale: Inconvenience. Three items were averaged to create a composite measuring how important the barrier of being inconvenienced when donating is as a reservation to donating their healthy breast tissue (e.g., "Donating healthy breast tissue would be too inconvenient for me") ($\alpha = .71$).

Barriers Sub-Scale: Diffusion of Responsibility. Two items were averaged to create a composite measuring how important the barrier of thinking their donation is not necessary because others will donate is as a reservation to donating their healthy breast tissue (e.g., "Plenty of other women will donate healthy breast tissue so I don't have to ") ($r = .75$, $p < .001$).

Injunctive Norms

IBM includes both descriptive norms (beliefs about how common a behavior is among peers or important others) and injunctive norms (beliefs about what important other people think you should do) within the construct of social influences. Although descriptive norms were not included because of the low donation rates, the injunctive norms measured in this study emphasized culture as that was found to be an important barrier in formative research. Four items were averaged to create a composite measuring normative beliefs about what important others would think about donating healthy breast tissue (e.g., "People from my culture wouldn't normally do this") ($\alpha = .87$). These measures were collected on the same scale as the barriers measures and reverse-coded when necessary such that higher indicates more normative support for breast tissue donation.

Control Beliefs

According to IBM, this construct includes perceived behavioral control, how much personal agency someone has over a behavior, and self-efficacy, confidence to perform the behavior if desired (Montano & Kasprzyk, 2015). Five items used a seven-point Likert-type scale from "Strongly Disagree" to "Strongly Agree" (e.g., "I would need to get support from my family/friends before I decided to donate" and "If I wanted to donate, I'm confident I could"). Items were averaged to create a composite measure and reverse-coded when necessary with higher indicating greater perception of control ($\alpha = .73$).

Intentions

Since this is likely the first time most participants had heard about donating healthy breast tissue, two levels of intentions were measured: intentions to seek more information and intentions to donate. All items used a seven-point Likert-type scale from "Strongly Disagree" to "Strongly Agree."

Intentions to Seek More Information. Three items were averaged to create a composite measuring intentions to seek more information about donating healthy breast tissue (e.g., "I am likely to seek more information about donating") ($\alpha = .84$).

Intentions to Donate. Two items were averaged to create a composite measuring intentions to donate their healthy breast tissue in the near future (e.g., "I would be likely to donate in the next 3 months") ($r = .91$, $p < .001$).

Personal Experience

Three items were summed to create a composite measuring whether participants have known anyone, a close relative (e.g., sister, aunt, mother), or a friend who has been diagnosed with breast cancer. These were yes/no items with 0 = no and 1 = yes that were summed to create a composite with a range of 0 to 3. Although this concept is not a key variable in either HBM or IBM, this was considered a variable that could be closely related to risk perceptions and may be useful to examine with the context of the findings.

Results

Analysis Strategy

Independent sample t-tests were conducted to examine the hypotheses. If Levene's Test for equality of variance was significant (i.e., unequal variance between groups), then results are reported from SPSS output under "equal variance not assumed." ANCOVAs were used to examine the research questions with Asian sub-group as the conditions. Whether or not a participant was born in the United States was used as a covariate control, since a crosstabulation revealed that Southeast and South Asians within the sample were more likely to have been born outside the United States than East Asians in the sample, $X^2(2, 406) = 36.7$, $p < .001$. Variance attributed to birthplace did not significantly contribute to the vast majority of the models, with the exception of those born outside of the United States citing inconvenience as an important barrier to donation and feeling as if they have less control over their donation decision than those born in the United States.

H1: HBM Comparison for Asian vs. Non-Asian Women

H1 investigated differences among Asian and non-Asian women on the Health Belief Model constructs. H1 was partially supported in that Asian women had significantly lower perceived benefits of healthy tissue donation related to protecting loved ones and helping research, and higher barriers to healthy breast tissue donation related to discomfort/pain, inconvenience, and diffusion of responsibility. No significant differences were found for susceptibility of breast cancer or the benefits of honoring survivors, feeling empowered, or representing ethnicity. Surprisingly, significant results were found for severity beliefs, however, in the opposite of the predicted direction, such that Asian women had higher severity beliefs about breast cancer than non-Asians. See Table 1 for H1 result statistics.

RQ1: HBM Comparison for East, Southeast, and South Asian Women

RQ1 examined similarities and differences among East, Southeast, and South Asians on the Health Belief Model constructs. Significant differences were found, such that South Asian women had higher levels of perceived severity of breast cancer, perceived all the benefits of donation as more motivating, and reported concerns about discomfort/pain as more discouraging than East Asians. East Asians were also significantly lower on each of the benefits and reported inconvenience as a greater barrier to donation compared to Southeast Asians. Southeast and South Asians were significantly different on only two constructs, such that South Asians thought discomfort/pain and inconvenience were greater barriers to donation. Similar levels of perceived susceptibility and the barrier related to diffusion of responsibility were found among all three sub-groups. See Table 2 for RQ1 result statistics.

H2: IBM Comparison for Asian vs. Non-Asian Women

H2 investigated differences among Asian and non-Asian women on the Integrated Behavioral Model constructs. H2 was partially supported, such that Asian women had significantly lower injunctive norms supporting breast tissue donation, lower perceived behavioral control about donating, and lower intentions to donate healthy breast tissue. No significant differences were found related to intentions to seek out more information about donating. See Table 3 for H2 result statistics.

RQ2: IBM Comparison for East, Southeast, and South Asian Women

RQ2 examined similarities and differences among East, Southeast, and South Asians on the Integrated Behavioral Model constructs. Significant differences were found, such that East Asian women had higher levels of injunctive norms supporting healthy breast tissue donation and greater perceived behavioral control, yet lower information seeking and donation intentions than either Southeast or South Asian

Table 1. Independent sample *t*-tests, H1 Asian vs. Non-Asian on HBM constructs.

HBM Construct	Sample	M	SD	t-statistic	df	Sig.
Perceived susceptibility	Asian	3.44	1.32	0.23	1315	.83
	Non-Asian	3.46	1.38			
Perceived severity	Asian	4.18	1.37	−2.04*	1315	.04
	Non-Asian	4.01	1.37			
Benefit: Protecting loved ones	Asian	4.92	1.31	2.23*	918.62	.03
	Non-Asian	5.10	1.45			
Benefit: Honoring survivors	Asian	4.59	1.28	0.92	976.66	.36
	Non-Asian	4.66	1.52			
Benefit: Helping research	Asian	5.30	1.08	3.06**	917.81	.002
	Non-Asian	5.50	1.20			
Benefit: Feeling empowered	Asian	5.18	1.11	1.10	990.23	.27
	Non-Asian	5.25	1.34			
Benefit: Representing ethnicity	Asian	4.12	1.53	−1.49	1026.11	.14
	Non-Asian	3.97	1.92			
Barrier: Discomfort/pain	Asian	5.05	1.07	−7.48***	1026.03	< .001
	Non-Asian	4.54	1.35			
Barrier: Inconvenience	Asian	4.30	1.12	−7.54***	993.58	< .001
	Non-Asian	3.77	1.37			
Barrier: Diffusion of responsibility	Asian	3.48	1.31	−4.86***	922.23	< .001
	Non-Asian	3.09	1.47			

***p < .001, **p < .01, *p < .05.

Table 2. ANCOVA, RQ1 East, Southeast, and South Asian on HBM constructs.

HBM Construct	F-ratio	Sig.	Sample	EMM	SE	Post-hoc Sig.
Perceived susceptibility	0.18	.84	East	3.42	.09	ns
			Southeast	3.49	.14	
			South	3.38	.14	
Perceived severity	5.61**	.004	East	3.96	.09	East/South** = .001
			Southeast	4.23	.14	East/Southeast = .10
			South	4.52	.14	Southeast/South = .13
Benefit: Protecting loved ones	17.92***	< .001	East	4.55	.09	East/South*** < .001
			Southeast	5.29	.13	East/Southeast*** < .001
			South	5.38	.13	Southeast/South = .61
Benefit: Honoring survivors	18.72***	< .001	East	4.22	.09	East/South*** < .001
			Southeast	5.04	.13	East/Southeast*** < .001
			South	4.97	.13	Southeast/South = .68
Benefit: Helping research	7.29**	.001	East	5.11	.07	East/South** = .001
			Southeast	5.47	.11	East/Southeast* = .02
			South	5.58	.11	Southeast/South = .45
Benefit: Feeling empowered	9.09***	< .001	East	4.97	.07	East/South*** < .001
			Southeast	5.39	.11	East/Southeast** = .001
			South	5.48	.11	Southeast/South = .58
Benefit: Representing ethnicity	4.01*	.02	East	3.93	.11	East/South* = .04
			Southeast	4.43	.16	East/Southeast* = .01
			South	4.31	.16	Southeast/South = .60
Barrier: Discomfort/pain	5.01**	.007	East	5.02	.07	East/South* = .02
			Southeast	4.82	.11	East/Southeast = .18
			South	5.30	.11	Southeast/South** = .002
Barrier: Inconvenience	4.59*	.01	East	4.35	.08	East/South = .27
			Southeast	3.99	.12	East/Southeast* = .04
			South	4.43	.11	Southeast/South** = .006
Barrier: Diffusion of responsibility	2.04	.13	East	3.50	.09	ns
			Southeast	3.30	.14	
			South	3.68	.13	

***p < .001, **p < .01, *p < .05. df = 2 for all F-ratios.

women. The only significant difference between Southeast and South Asians was that South Asians had lower intentions to donate than Southeast Asians. See Table 4 for RQ2 result statistics.

Discussion

There proved to be numerous, substantial differences in HBM and IBM constructs between non-Asian and Asian women, and some important within-ethnic differences. These findings can be used to create messages targeting Asian-American women to increase healthy breast tissue donation. On nearly every construct within both HBM and IBM, Asian women,

especially East Asian women, were significantly less inclined toward healthy breast tissue donation, including lower perceived benefits, greater barriers, and lower intentions. Interestingly, although as a whole Asian women reported lower injunctive norms and control beliefs, the examination among the Asian sub-groups revealed that Southeast and South Asians are significantly lower in these beliefs than East Asians. While this study did not explore the reasons for these within-ethnic differences, other scholars have suggested that there may be important historic and cultural traditions and beliefs associated with country of origin that continue through generations of immigrants and may affect values related to conformity to norms and collectivism (Kim et al.,

Table 3. Independent sample *t*-tests, H2 Asian vs. Non-Asian on IBM constructs.

IBM Construct	Sample	M	SD	t-statistic	df	Sig.
Injunctive norms	Asian	4.80	1.43	9.00***	1312	< .001
	Non-Asian	5.55	1.41			
Control beliefs	Asian	3.90	1.00	8.99***	985.63	< .001
	Non-Asian	4.47	1.20			
Intentions: Info seeking	Asian	4.87	1.35	0.17	1274	.91
	Non-Asian	4.88	1.48			
Intentions: Donating	Asian	3.38	1.56	2.13*	1274	.03
	Non-Asian	3.59	1.67			

***$p < .001$, *$p < .05$.

Table 4. ANCOVA, RQ2 East, Southeast, and South Asian on IBM constructs.

IBM Construct	F-ratio	Sig.	Sample	EMM	SE	Post-hoc Sig.
Injunctive norms	5.47**	.005	East	5.02	.10	East/South** = .009
			Southeast	4.46	.15	East/Southeast*** < .001
			South	4.64	.14	Southeast/South = .36
Control beliefs	5.35**	.005	East	4.09	.07	East/South*** < .001
			Southeast	3.77	.10	East/Southeast** = .001
			South	3.74	.10	Southeast/South = .90
Intentions: Info seeking	5.28**	.005	East	4.65	.09	East/South* = .03
			Southeast	5.17	.14	East/Southeast** = .002
			South	5.02	.14	Southeast/South = .46
Intentions: Donating	10.51***	< .001	East	3.55	.09	East/South* = .047
			Southeast	4.36	.15	East/Southeast*** < .001
			South	3.85	.14	Southeast/South* = .01

***$p < .001$, **$p < .01$, *$p < .05$. $df = 2$ for all F-ratios.

2001). For example, East Asians are thought to be more strongly influenced by Buddhism and Confucianism than Southeast Asians, for whom these influences were diminished from greater contact with foreign colonial cultures (Kim et al., 2001).

Health Belief Model Comparisons

On closer examination of the HBM constructs, while all three of the barrier categories were significantly more of a barrier to Asian women compared to non-Asian women, only two of the five benefit categories were significantly different among these populations. These findings suggest Asians were more inclined to consider the impediments to donation, while the benefits of donation may be similarly felt across populations (with the exceptions of protecting loved ones and helping research). KTB should strongly consider addressing key barriers to donation (i.e., discomfort/pain, inconvenience, diffusion of responsibility) when communicating with potential donors who are Asian. These findings also suggest that messages highlighting the benefits of donation related to honoring survivors, feeling empowered, and representing ethnicity may be equally effective across various ethnicities.

Within the HBM constructs, a surprising finding was a non-significant difference in perceived susceptibility for breast cancer between Asian and non-Asians and also between East and South Asians. This non-significant finding suggests that messages promoting healthy breast tissue donation should not focus on increasing susceptibility beliefs. Examining this finding more closely, significantly more Asians in the sample were born outside of the United States (56.2%) than non-Asians (7.9%), $X^2(1, 1284) = 364.5$, $p < .001$; however, it was unknown how long those born outside of the United States had lived in the United States. Some research suggests that

living in the United States may result in susceptibility beliefs similar to those born in the United States over time. (Hasnain et al., 2014). Future research should examine moderating factors that may contribute to an overall non-significant difference in perceived susceptibility.

Integrated Behavioral Model Comparisons

Within IBM, highly significant differences emerged between Asian and non-Asian women for all of the constructs. Compared to non-Asians, Asian women reported lower injunctive norms, control beliefs, and intentions to donate their healthy breast tissue. Interestingly, there was no significant difference between Asian and non-Asian women on intention to seek more information about donating healthy breast tissue.

A key factor that may affect many of the results was that Asian women may simply be lacking exposure to other women with breast cancer compared to non-Asian women. Likely a substantial reason for the disparity over the lower benefits Asians perceived from protecting loved ones was the consequential difference in personal experience with cancer. Non-Asian participants were significantly more likely to report knowing someone—a friend or close family member—who had been diagnosed with breast cancer ($M = 1.42$, $SD = 1.10$) than the Asian women ($M = 1.10$, $SD = 1.05$), t (867.84) = 4.93, $p < .001$. This difference may have also factored into differences related to the benefit of wanting to help breast cancer research, the barrier of diffusion of responsibility, and intentions to donate. Tissue donors interviewed as part of the exploratory portion of the present study reported a strong need to know precise details about the actual donation process, which is as invasive as a breast biopsy. In such a scenario, one could expect that barriers

would seem more daunting, benefits more abstract, without the ability to associate the face and name of a loved one to link with the disease.

Within Ethnic Group Comparisons

More significant differences emerged with a nuanced look within the Asian community in our sample. While we found that Asian women considered breast cancer to be more severe than non-Asian women, South Asian women considered a breast cancer diagnosis to be the most severe of all the women in our sample (see Table 2). South and East Asian women were significantly more likely to see the barriers of discomfort/pain and inconvenience as donation hindrances than Southeast Asians. While Southeast and South Asian women were significantly more likely to view the benefits of donation as motivating. Contrary to the predictions of the IBM, while East Asians reported more supportive injunctive norms and higher control beliefs, they still had lower intentions to seek information and donate than either Southeast or South Asians. Overall, these sub-group findings suggest Southeast Asians and to a slightly lesser extent South Asians may be more readily convinced to donate their healthy breast tissue than East Asians. One key difference that could be targeted through messaging is the lack of benefits perceived by East Asians related to donating their healthy breast tissue. Researchers should investigate if perhaps there are other benefits that could be more motivating to East Asian women. When targeting South Asian women, marketers may want to try to focus on lessening barrier beliefs related to pain/discomfort and inconvenience. Communication with Southeastern Asians may instead want to focus on increasing injunctive norms and control beliefs.

Cultural factors between Asians and non-Asians and also between sub-groups are another area ripe for more exploration. It was thought that concern about societal, peer and family opinions, and privacy about physical contact would be more significant among Asian women. These cultural differences may have been most strongly expressed through the low injunctive norms Asian women had toward healthy breast tissue donation. On the other hand, there was no significant advantage to highlighting the benefit of having one's ethnicity represented between Asians and non-Asians, and yet this was seen as a stronger benefit for Southeast and South Asians compared to East Asians. This research supports the idea that although Asian Americans are distinct from White Americans in their health beliefs and intentions to donate breast tissue, there are important within-ethnic differences, and cultural homogeneity should not be assumed on this and likely other health-related issues.

Limitations

Likely because of the length of this online survey (>20 minutes), there was a large number of non-completed surveys. Still, the survey yielded a substantial sample from which a number of significant relationships emerged. While this study is novel in investigating differences among East, Southeast, and South Asians for this health issue, the authors also recognize that the three ethnic categories selected herein could be far more discerning and future research should try to include a larger sample of nationality-based sub-groups within these populations. While this study sought to generally look at theory-based variables among these populations, future research should consider potential moderators of these effects, such as age, years lived in the United States, and relationship to anyone diagnosed with breast cancer.

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References

Ahmadian, M., & Abu Samah, A. (2013). Application of health behavior theories to breast cancer screening among Asian women. *Asian Pacific Journal of Cancer Prevention*, *14*, 4005–4013. doi:10.7314/APJCP.2013.14.7.4005

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11–39). New York, NY: Springer.

American Cancer Society. (2014a). *American Cancer Society estimated new cancer cases by sex and age (years), 2014*. Retrieved from http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-041776.pdf

American Cancer Society. (2014b). *American Cancer Society estimated cancer deaths by sex and age (years), 2014*. Retrieved from http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-041775.pdf

Austin, L. T., Ahman, F., McNally, M. J., & Stewart, D. E. (2002). Breast and cervical cancer screening in Hispanic women: A literature review using the health belief model. *Women's Health Issues*, *12*, 122–128. doi:10.1016/S1049-3867(02)00132-9

Bae, H. S., & Kang, S. (2008). The influence of viewing an entertainment-education program on cornea donation intention: A test of the theory of planned behavior. *Health Communication*, *23*, 87–95. doi:10.1080/10410230701808038

Bernstein, R. (2013). *Asians fastest-growing race or ethnic group in 2012, census bureau reports*. Retrieved from http://www.census.gov/newsroom/press-releases/2013/cb13-112.html

Berry, T. R., Curtin, K. D., Courneya, K. S., McGannon, K. R., Norris, C. M., Rodgers, W. M., & Spence, J. C. (2016). Heart disease and breast cancer perceptions: Ethnic differences and relationship to attentional bias. *Health Psychology Open*, *3*, 1–11. doi:10.1177/2055102916657673

Bresnaham, M., Lee, S. Y., Smith, S. W., Shearman, S., Nebashi, R., Park, C. Y., & Yoo, J. (2007). A theory of planned behavior study of college students' intention to register as organ donors in Japan, Korea, and the United States. *Health Communication*, *21*, 201–211. doi:10.1080/10410230701307436

Champion, V. L. (1999). Revised susceptibility, benefits and barriers scale for mammography screening. *Research in Nursing & Health*, *22*, 341–348. doi:10.1002/(SICI)1098-240X(199908)22:4<341::AID-NUR8>3.0.CO;2-P

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (4th ed., pp. 45–65). San Francisco, CA: Jossey-Bass.

Cheung, A. H., Alden, D. L., & Wheeler, M. S. (1998). Cultural attitudes of Asian-Americans toward death adversely impact organ donation. *Transplantation Proceedings*, *30*, 3609–3610. doi:10.1016/S0041-1345(98)01156-7

Donnelly, T. T. (2006). The health-care practices of Vietnamese-Canadian women: Cultural influences on breast and cervical cancer screening. *Canadian Journal of Nursing Research*, *38*, 82–101.

Retrieved from http://www.ingentaconnect.com/content/mcgill/cjnr/2006/00000038/00000001/art00006?crawler=true

English, T., & Chen, S. (2007). Culture and self-concept stability: Consistency across and within contexts among Asian Americans and European Americans. *Journal of Personality and Social Psychology*, 93, 478–490. doi:10.1037/0022-3514.93.3.478

Fishbein, M., Bandura, A., Triandis, H. C., Kanfer, F. H., Becker, M. H., & Middlestadt, S. E. (1992). *Factors influencing behavior and behavior change: Final report-theorist's workshop*. Bethesda, MD: National Institute of Mental Health.

Fishbein, M., & Yzer, M. C. (2003). Using theory to design effective health behavior interventions. *Communication Theory*, 13, 164–183. doi:10.1111/j.1468-2885.2003.tb00287.x

Glenn, B. A., Chawla, N., & Bastani, R. (2012). Barriers to genetic testing for breast cancer risk among ethnic minority women: An exploratory study. *Ethnicity & Disease*, 22, 267–273. Retrieved from https://www.ethndis.org/edonline/index.php/ethndis/article/view/449/498

Gomez, S. L., Quach, T., Horn-Ross, P. L., Pham, J. T., Cockburn, M., Chang, E. T., ... Clarke, C. A. (2011). Hidden breast cancer disparities in Asian women: Disaggregating incidence rates by ethnicity and migrant status. *American Journal of Public Health*, 100, S125–S131. doi:10.2105/AJPH.2009.163931

Han, Y., Williams, R. D., & Harrison, R. A. (2000). Breast cancer screening knowledge, attitudes, and practices among Korean American women. *Oncology Nursing Forum*, 27, 1585–1591. Retrieved from https://onf.ons.org/

Hasnain, M., Menon, U., Ferrans, C. E., & Szalacha, L. (2014). Breast cancer screening practices among first-generation immigrant Muslim women. *Journal of Women's Health*, 23, 602–612. doi:10.1089/jwh.2013.4569

Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Behavior*, 11, 1–47. doi:10.1177/109019818401100101

Kaplan, C. P., Lopez, M., Tice, J., Pasick, R., Kerlikowske, K., Chen, A., & Karliner, L. (2012). The gap between perceptions of risk and actual risk for breast cancer. *Cancer Research*, 72, P4-13-05. doi:10.1158/0008-5472.SABCS12-P4-13-05

Kim, B. S. K., Yang, P. H., Atkinson, D. R., Wolfe, M. M., & Hong, S. (2001). Cultural value similarities and differences among Asian American ethnic groups. *Cultural Diversity and Ethnic Minority Psychology*, 7, 343–361. doi:10.1037/1099-9809.7.4.343

Kim, R. (2002). *Use of a theoretical framework to understand factors that influence participation in mammography screening among Korean women* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses (ISBN: 049374041)

Komen Tissue Bank (KTB). (2011). *About KTB home*. Retrieved from http://komentissuebank.iu.edu/about-ktb/

Lee, H. Y., Stange, M. J., & Ahluwalia, J. S. (2015). Breast cancer screening behaviors among Korean American immigrant women. *Journal of Transcultural Nursing*, 26, 450–457. doi:10.1177/1043659614526457

Lee-Lin, F., Menon, U., Leo, M. C., & Pedhiwala, N. (2013). Feasibility of a targeted breast health education intervention for Chinese American immigrant women. *Oncology Nursing Forum*, 40, 361–372. doi:10.1188/13.ONF.361-372

Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed., pp. 168–222). San Francisco, CA: Jossey-Bass.

Park, S. K., Kim, Y., Kang, D., Jung, E. J., & Yoo, K. Y. (2011). Risk factors and control strategies for the rapidly rising rate of breast cancer in Korea. *Journal of Breast Cancer*, 14, 79–87. doi:10.4048/jbc.2011.14.2.79

Parsa, P., Kandiah, M., Abdul Rahman, H., & Zulkefli, N. M. (2006). Barriers for breast cancer screening among Asian women: A mini literature review. *Asian Pacific Journal of Cancer Prevention*, 7, 509–514. Retrieved from http://journal.waocp.org/article_24516.html

Poonawalla, I. B., Goyal, S., Mehrotra, N., Allicock, M., & Balasubramanian, B. A. (2014). Attitudes of South Asian women to breast health and breast cancer screening: Findings from a community based sample in the United States. *Asian Pacific Journal of Cancer Prevention*, 15, 8719–8724. doi:10.7314/APJCP.2014.15.20.8719

Richards, A. S. (2014). Predicting attitude toward methamphetamine use: The role of antidrug campaign exposure and conversations about meth in Montana. *Health Communication*, 29, 124–136. doi:10.1080/10410236.2012.728469

Walker, K., Steinfort, E. L., & Keyler, M. J. (2015). Cues to action as motivators for children's brushing. *Health Communication*, 30, 911–921. doi:10.1080/10410236.2014.904030

Wu, T. Y., Lin, C., Chen, S. L., & Jung, Y. (2014). A community-based intervention to promote breast cancer awareness and screening among Asian American women. *International Quarterly of Community Health Education*, 34, 171–185. doi:10.2190/IQ.34.2.e

Yarbrough, S. S., & Braden, C. J. (2008). Utility of Health Belief Model as a guide for explaining or predicting breast cancer screening behaviours. *Journal of Advanced Nursing*, 33, 677–688. doi:10.1046/j.1365-2648.2001.01699.x

Youlden, D. R., Cramb, S. M., Dunn, N. A., Muller, J. M., Pyke, C. M., & Baade, P. D. (2012). The descriptive epidemiology of female breast cancer: An international comparison of screening, incidence, survival and mortality. *Cancer Epidemiology*, 36, 237–248. doi:10.1016/j.canep.2012.02.007

Ziegler, R. G., Hoover, R. N., Pike, M. C., Hildesheim, A., Nomura, A. M., West, D. W., ... Hyer, M. B. (1993). Migration patterns and breast cancer risk in Asian-American women. *Journal of the National Cancer Institute*, 85, 1819–1827. doi:10.1093/jnci/85.22.1819