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ORIGINAL PAPER

Associations between Fatalistic Cancer Beliefs and Cancer-Screening Behaviors in Chinese American Immigrant Women

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Abstract

Chinese Americans have among the lowest rates of up-to-date cancer screening in the United States. Fatalistic health beliefs are also common in this population and can lead to decreased healthcare utilization. We sought to understand how these fatalistic beliefs are associated with cancer screening behaviors in this underserved population. A cross-sectional survey was conducted with 732 Chinese women from the greater Chinatown area of Chicago, Illinois. Surveyed questions included sociodemographic information, self-reported healthcare utilization and cancer screening behaviors. The majority of respondents were older than 50, spoke Chinese, had less than a college education, public or no medical insurance, and an annual income < $20,000. Approximately 20% had never received Papanicolaou or mammogram screening. Fatalistic beliefs were common and associated with increased health-seeking behaviors and appropriate Pap and mammogram screening. In this cohort of Chinese American immigrant women in an urban Chinatown community, fatalistic cancer beliefs were prevalent and associated with increased health-seeking and positive cancer screening behaviors. This previously unreported relationship could be leveraged in improving health outcomes of an underserved population.

Keywords Chinese Americans · Early detection of cancer · Women's health · Health knowledge · attitudes · practice · Culture

Introduction

Asian Americans, the fastest growing new-immigrant demographic in the United States (US), have the lowest cancer screening rate among all racial/ethnic minorities [1] despite cancer being their leading cause of death [2]. Chinese American women are particularly less likely than other Asian-American women to have received a recent Papanicolaou (Pap) smear or mammogram [3]. The reasons behind the low screening rates are multifactorial. Historically, determinants of screening underutilization included extremes of age (young adults or the elderly), lower education or socioeconomic status, lack of insurance, and prohibitive costs [4]. Recent studies have produced similar findings, but also have begun to center on racial and cultural barriers, as well as low health literacy [5–9]. Indeed, a large database of health information trends have revealed that not only are older female respondents less likely to know what prevention recommendations to follow, older minority respondents are more likely to believe their risk of developing cancer is lower than that of their peers [10]. Not unexpectedly, the presence of a language barrier and subsequent cultural isolation also leads to major delays in obtaining recommended screening tests [3, 11].

These lapses in screening are somewhat contradictory to the strong interest the general US population has in cancer. Active health-seeking behaviors have been found to be associated with adherence to cancer screening behavior [12],

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which would suggest a health benefit for individuals who seek out healthcare education. However, poor experiences with cancer information-seeking such as frustrating search processes or quality concerns are also associated with a sense of fatalism towards one's own relationship with cancer risks and prognosis [13]. A common philosophy among Chinese Americans, fatalism encompasses a deterministic belief that certain outcomes are predetermined and inevitable. Low health literacy also leads to fatalistic cancer views which are associated with both a decreased tendency to seek health information [14] and a greater belief that advanced cancer can be cured [15]. These complex relationships are modified by race and ethnicity as well as immigration status [16, 17], with higher fatalism in racial/ethnic minorities [18].

In addition to socioeconomic and education barriers underlying decreased screening practices, cultural beliefs surrounding fate and the stigma behind cancer are prevalent among Chinese American women [19–21]. Asian Americans also generally report lower rates of health information-seeking at baseline, although the rates differ substantially between different ethnic subgroups [22]. However, there has been a general increase in health-seeking behavior in the US immigrant population over the last 10 years, especially through internet use [23, 24]. This parallels the increasing popularity and use of social media applications and websites in China, where more than 90% of residents of major cities use the social media application *WeChat* daily, and more than 97% have seen or read health-related information through the application [25].

Despite data associating cancer beliefs of fatalism with decreased cancer prevention in the general American public [14, 26], the literature is lacking in describing these relationships in the Chinese American community [27, 28]. We explored this question in a cohort of Chinese immigrant women in Chicago's Chinatown. As this is a neighborhood predominantly consisting of low-income, low-educational attainment, working class immigrants [29], we target a demographic that has historically low rates of cancer screening. We hypothesize that fatalistic views towards cancer will predict less health-seeking behaviors and less breast and cervical cancer screening. By understanding these relationships, we hope to improve education and outreach efforts and increase cancer screening behaviors in this underserved population.

Methods

Participant Selection and Survey Administration

The cross-sectional survey data collected for this study were part of a larger intervention study evaluating patient navigation for cancer screening among Chinese women ages 21 and older living in Chicago's Greater Chinatown community area [30]. Participants were recruited through a multipronged approach, including word-of-mouth and flyers distributed at Chinatown community events and venues; and from referrals from providers at the safety net hospital located within the Greater Chinatown area where patient navigators provided information on the importance of breast and cervical cancer screening. To enroll participants, study team members conducted a brief eligibility screener, presented study information, obtained written informed consent, and scheduled an appointment to administer an intake form and baseline health survey. Once scheduled, baseline health surveys were administered by study team members in person in the participant's preferred language (Cantonese, Mandarin, or English). Baseline health survey topics included participant's cancer screening history, access and feelings about healthcare, social network use, and health-seeking behaviors, among other health-related questions. All data were collected between November 2013 and November 2018, with study team members entering participant responses directly into the REDCap data management platform. The Northwestern University Institutional Review Board approved all study procedures.

Surveyed Variables

Sociodemographic Characteristics

Surveyed demographic information included age, occupation, educational attainment, income, and insurance from standard population surveys.

Self-Reported Healthcare Utilization and Cancer Screening Behaviors

Health screening behaviors were determined through questions regarding the respondent's last checkup, Pap smear and mammogram, and number of visits to a healthcare professional. On-time or "appropriate" screening was determined as Pap smear within five years for participants age 21 to 67 [31] and mammogram within two years for respondents age 40 to 75 to liberally correspond with current guidelines. Notably for mammograms, we included participants age 40 and above in concordance with the National Comprehensive Cancer Network and American College of Obstetricians and Gynecologists [32, 33], with screening every 2 years to correspond with American College of Radiology and United States Preventive Services Taskforce guidelines [34, 35].

Cancer Beliefs

Personal beliefs about cancer were measured using questions adapted from the National Cancer Institute Health

Interview National Trends Survey (HINTS) [36]. Participants were asked to rate their personal likelihoods of getting cancer and their agreement with statements using a five-point Likert-type scale. Cancer fatalism was measured using three specific questions [26]: "it seems like everything causes cancer", "there is not much you can do to lower your chances of getting cancer", and "there are so many recommendations about preventing cancer, it's hard to know which ones to follow."

Health-Information Seeking Behaviors and Social Network Use

To learn more about a patient's healthcare information sharing behaviors, questions included where a patient seeks health information (print media, organizations, family or friends, healthcare professionals, the internet, television, telephone), when and whether health information is directly shared by the participant or her contacts on social networks, and the method (in-person, phone, messaging, e-mail, social media sites) of sharing health information. These questions were taken directly from the HINTS.

Statistical Analysis

Descriptive statistics summarized participant demographics, cancer beliefs, and cancer-screening behaviors. Frequency and percent were calculated for categorical variables and mean ± standard deviation, median, and range for numeric variables. To determine whether participant beliefs were related to cancer-screening behavior, logistic regression was performed with cancer-screening behaviors as the outcome and cancer beliefs as the independent variable of interest. Clinically meaningful covariates (participant age, insurance status, family history of cancer, and years in the US) were included regardless of statistical significance to adjust for potential confounding.

Statistical analyses were conducted using R (version 3.5.3, 2019, The R Foundation) and an online calculator provided by MedCalc (https://www.medcalc.org/calc/, MedCalc Software, Ostend, Belgium). All analyses assumed a two-sided, 5% level of significance. We did not adjust for multiple hypothesis testing.

Results

Demographics

Between November 2013 and November 2018, 732 Chinese immigrant women completed the baseline health survey for the intervention study (Table 1). Approximately 60% were aged 50 or older and reported having lived in the United States for at least 10 years. The majority were employed (65%), had less than a college education (92%), and an annual income of less than $20,000 (56%). Over 94% of surveyed participants spoke only or mostly Chinese and over 80% were covered by public insurance or did not have insurance.

Table 1 Demographics of study population (N = 732)

	n (%)
Age	
21–29 years	11 (1.5)
30–39 years	56 (7.7)
40–49 years	220 (30.1)
50 years or older	435 (59.4)
Occupation	
Employed	479 (65.4)
Retired	120 (16.4)
Unemployed or other	130 (18.2)
Highest education	
Less than high school	344 (46.9)
High school	329 (44.9)
College or more	57 (7.8)
Duration in United States	
Less than 5 years	113 (15.4)
5 to 10 years	159 (21.7)
10 to 20 years	256 (35.0)
More than 20 years	185 (25.3)
Average income	
$0–10 k	151 (20.6)
$10–20 k	255 (34.8)
$20–50 k	285 (38.9)
More than $50 k	27 (3.7)
Health insurance	
None	276 (37.7)
Medicare/Medicaid/County Care	316 (43.1)
Private	110 (15.0)
Other	34 (4.6)
Languages read/spoken	
Only Chinese	484 (66.1)
More Chinese than English	198 (27.0)
Both Chinese and English equally	42 (5.7)
More English than Chinese	7 (0.9)

Health Care Utilization and Cancer Screening Behaviors

Less than half of respondents reported having a health professional whom she sees regularly, 72% reported having obtained a checkup within the past year (Table 2). Regarding cancer screening tests, 138 individuals (19%) reported never receiving a Pap smear and 177 (24%) reported never

Table 2 Health screening behavior of participants (N = 732)

	n (%)
Has a health professional that the respondent goes to regularly	322 (44.0)
Family history of cancer	207 (28.3)
Last checkup	
Less than 1 year ago	525 (71.7)
1 to 5 years ago	112 (15.3)
More than 5 years ago	31 (4.2)
Never	57 (7.8)
Unknown	7 (1.0)
Number of visits to healthcare professional in past year	
0	169 (23.1)
1	177 (24.2)
2 to 4	294 (40.2)
5 to 9	67 (9.2)
10 or more	21 (2.9)
Last pap smear	
Within 5 years	504 (87.7)
More than 5 years ago	84 (11.5)
Unknown or did not answer	6 (0.8)
Never	138 (18.9)
Appropriate interval for last pap smear[a] (n = 652)	473 (72.5)
Last mammogram	
Within past 2 years	379 (51.8)
More than 2 years ago	173 (13.6)
Unknown or did not answer	3 (0.5)
Never	177 (24.2)
Appropriate interval for last mammogram[b] (n = 623)	343 (55.0)

[a]Appropriate interval for Pap smear only evaluated for participants age ≤ 67 years

[b]Appropriate interval for last mammogram only evaluated for participants age > 40 and ≥ 75 years

receiving a mammogram. Most respondents received an appropriate Pap smear in the past 5 years (72%) and a mammogram within the past 2 years (55%).There were 43 (7% of all participants who have ever had a Pap smear) patients who reported a history of an abnormal Pap smear and 66 (13% of participants who have ever had a mammogram) who reported a history of an abnormal mammogram. Follow-up was 86% and 88% for those abnormal tests, respectively.

Cancer Beliefs

A quarter of surveyed women (n = 188) thought it was likely she would develop cancer in her lifetime while 7% (n = 51) felt that they were more likely to get cancer than their peers. Other fatalistic beliefs were common in this group, with almost half of respondents preferring not to know their personal chances of getting cancer (n = 324, 44%) or feeling like they have no control in lowering their personal chance of cancer (n = 346; 47%). Furthermore, more than 60% felt like everything causes cancer (n = 459; 63%) and that the many recommendations on preventing cancer make it hard to know which ones to follow (n = 492; 67%) (Table 3).

Health Sharing Behaviors

Most respondents shared health information with family (70%) and friends (68%), with the most popular method of sharing being face-to-face followed by phone and social networking. Almost half of respondents have sought out health information from an outside source; when asked what resource an individual would use first, the internet was selected by 44% of individuals. No individuals reported that they would first seek out information from a cancer organization or a complementary/alternative medicine provider (Table 4).

A smaller proportion of individuals answered questions specifically about social networks (n = 254) because of a later modification to the intake survey. Of these respondents, 182 participants (71.7%) reported social network use in some capacity. Demographically, this group was younger (average age 47.5 ± 10.5 years), more employed (77%), and better educated (72% with greater than high school education) than the larger group. Half of those who used social networks stated that they have looked to social network contacts for health opinions and information. However, most (63.5%) of these respondents have personally posted and shared health information on social network sites, and 81% reported noticing contacts posting health information on social network sites.

Relationships

Cancer beliefs were examined in relationship to individual's health-seeking behaviors. Fatalistic beliefs that everything causes cancer and that one was likely to get cancer during their lifetime were associated with 57% and 47% greater odds of ever seeking health information from any source, respectively (OR 1.57 95% CI 1.13–2.20 p = 0.008; OR 1.47 95% CI 1.02–2.12 p = 0.037). On the other hand, participants who believe there is not much they can do to lower chances of cancer have 31% lower odds of seeking health information (OR 0.69 95% CI 0.50–0.95 p = 0.025).

Regarding specific screening behaviors, respondents who felt they were more likely to get cancer than their peers were 2.6-times more likely to have appropriate Pap screening (OR 2.58 95% CI 1.13–7.00 p = 0.038), whereas those with the belief that there is not much one can do to lower one's chances of cancer had 39% lower odds of ever having a Pap smear (OR 0.61 95% CI 0.40–0.92 p = 0.021). Additionally, the belief that it is hard to know which recommendations for cancer prevention to follow was associated

Table 3 Relationship of dichotomized cancer beliefs and experiences with various health metrics

	Active health-seeking	P-value	Ever pap screened	P-value	Appropriate pap screening[a]	P-value	Ever mammo screened[b]	P-value	Appropriate mammo screening[c]	P-value
% Likely to very likely										
How likely are you to get cancer in your lifetime?	1.47 (1.02,2.12)	0.0371	1.17 (0.72,1.93)	0.54	1.24 (0.81,1.93)	0.33	0.51 (0.28,0.89)	0.021	1.37 (0.91,2.08)	0.13
% More likely to much more likely										
Compared to other people your age, how likely are you to get cancer in your lifetime?	1.12 (0.57,2.23)	0.7413	1.15 (0.52,2.91)	0.75	2.58 (1.13,7)	0.038	0.21 (0.03,0.73)	0.036	1.12 (0.57,2.23)	0.74
% Strongly or somewhat agree										
I'd rather not know my chance of getting cancer	0.94 (0.69–1.29)	0.72	1.1 (0.73–1.64)	0.66	1.21 (0.84–1.76)	0.31	1.0 (0.64–1.55)	0.99	1.14 (0.8–1.61)	0.47
It seems like everything causes cancer	1.57 (1.13–2.20)	0.0079	1.2 (0.79–1.82)	0.39	1.17 (0.79–1.7)	0.43	0.78 (0.5–1.25)	0.30	1.14 (0.79–1.66)	0.47
There's not much you can do to lower your chances of getting cancer	0.69 (0.50–0.95)	0.025	0.61 (0.40–0.90)	0.021	0.72 (0.49–1.04)	0.083	1.08 (0.69–1.7)	0.74	1.03 (0.72–1.47)	0.87
There are so many different recommendations about preventing cancer, it's hard to know which ones to follow	1.04 (0.74–1.47)	0.82	0.72 (0.45–1.13)	0.16	0.85 (0.56–1.27)	0.43	1.87 (1.13–3.18)	0.018	0.74 (0.51–1.09)	0.13

Participants were asked to respond to the following statements or questions utilizing a Likert scale, with comparisons made between those respondents who selected the italicized choices compared to those who selected the other choices on the scale. All values represent adjusted odds ratios with 95% confidence intervals. The appropriateness of Pap smear screening was only evaluated for participants age ≤ 67 years ([a]), ever having obtained a mammogram evaluated for participants age > 40 ([b]), and appropriateness mammogram screening only evaluated for participants age > 40 and ≤ 75 years ([c]), Mammo = Mammogram

Table 4 Health-information sharing and seeking behaviors of respondents (N = 732)

	n (%)
Ever share health information with	
Family	516 (70.4)
Friends	502 (68.5)
Method of sharing health information[b]	
Face-to-face	384 (74.6)
Phone	235 (45.6)
Online/social networking[a]	136 (32.9)
Other	1 (0.2)
Ever sought out health information	329 (44.9)
First location to seek health information (n = 329)	
Internet	147 (44.5)
Newspapers	72 (21.8)
Books, brochures, pamphlets, magazines	51 (15.5)
Friend/Co-worker	16 (4.8)
Doctor or healthcare provider	10 (3.0)
Other	34 (10.3)

[a]Includes e-mail, online message, text messaging

[b]Respondents could select more than one response

with 87% greater odds of ever having a mammogram (OR 1.87 95% CI 1.13–3.18 p = 0.018). Data does not suggest cancer beliefs were associated with having appropriate mammogram screening.

Discussion

Our cohort of majority non-English-speaking, older Chinese immigrant women of low socioeconomic classes who are either on public health insurance or uninsured represents a demographic that is not well studied or understood in the current literature on cancer beliefs and health-seeking behaviors. Most respondents in our convenience sample do not have a regular healthcare provider but do routinely seek care, with 72% having obtained some sort of checkup in the past year and most having received recent breast and cervical cancer screening. Our respondents also actively shared and sought health information, depicting a population that desires and embraces medical attention, despite historically low cancer screening rates [1] and comparatively low follow-up rates for abnormal exams [37].

Consistent with prior research suggesting that lower health literacy leads to cancer fatalism [14] and the inherent high degree of fatalism in the Chinese community [28], many in our cohort of immigrant Chinese women agreed with fatalistic cancer statements including "it seems like everything causes cancer". Surprisingly, some of these beliefs were associated with active health-seeking behaviors as well as a greater likelihood of appropriate Pap screening, which is counter to trends reported in the literature [13, 14, 16, 20, 27]. A positive relationship between health-information seeking and screening behaviors with fatalistic cancer beliefs has not been previously described, except for one study showing that poor cancer-seeking experiences were associated with cancer fatalism [13]. Accordingly, this raises the possibility that while our cohort of Chinese American women actively seek health-information and care, they might have had negative experiences with their information gathering. Indeed, more than 65% of our respondents felt that there were so many recommendations for cancer prevention that it is difficult to know which ones to follow.

Alternatively, our results may represent a previously unexplored facet of Chinese American culture where positive health behaviors arise from fatalistic views. Indeed, one study showed that higher levels of fatalism in Chinese and Korean participants was associated with better exercise behavior, although they could not explain why [28]. Fatalism in this immigrant community may instead be the reason for adherence to cancer screening and health-seeking. If so, healthcare workers and outreach teams should not be discouraged by a woman's fatalism but rather work within those beliefs to promote positive habits and health behaviors.

Regardless of the relationship between health-seeking behaviors and fatalistic cancer beliefs, our data reinforces a need to enhance communication of cancer screening recommendations. While more than 70% of respondents reported sharing health information face-to-face with family and friends, the most popular source of seeking health information was via the internet. Our population thus appears to prefer obtaining their health information online but distributing it word-of-mouth, which could lead to misinformation and confusion.

The smaller cohort of respondents who used social media tended to ask their social network contacts for health opinions or information, and either shared or noticed contacts sharing health information on these sites. This is important for purposes of effective outreach, as studies have consistently shown that Chinese Americans rely on physicians as their most trusted source of health information despite an increase in multimedia and online use, and respond most positively to physician recommendations for affecting screening behaviors [3, 9]. As such, through utilizing social media to augment face-to-face encounters, health organizations and provider groups can disseminate factual information to individuals and either help correct or leverage those fatalistic cancer beliefs. Outreach programs towards the immigrant Chinese American community can harness the prevalence of social media to provide clear, digestible messages and better health information exposure.

Limitations of this study primarily stem from its survey-based format which relies on participant recall and

interpretation of questions. Moreover, we relied on self-reported cancer screening behaviors, which is often inaccurate and over reported [38] and our liberal definition of "appropriateness" for Pap and mammogram screening likely was over-inclusive of respondents. However, our use of a trained, multilingual researcher in conducting the survey also bolsters the response integrity especially given the low English literacy of the group. Accordingly, the generalizability of our data is likely limited to older, first-generation immigrant Chinese American women despite the diversity of Chicago's Chinatown community. Given that a focus of our study is towards improving understanding of an under-researched but growing population, this may indeed be a strength in providing much needed insight to an underserved group. Future studies should evaluate how individuals of this demographic want to obtain their health information and include qualitative methods to understand both the reasons for non-adherence to screening guidelines and the origins and nuances of fatalistic cancer beliefs. Perhaps the higher rate of adherence to Pap compared to mammogram was due to needing an additional appointment at an outside facility for the latter; comprehensive medical centers or "one-stop shops" may thus significantly improve screening rates [39]. Furthermore, studies are required to discern how social media can play a role in facilitating a positive dissemination of health knowledge given the varying degrees of quality and reliability of online resources like WeChat [25], [40].

Much of what we understand about health-information seeking behaviors in the US is abstracted from the HINTS database [36], a large national survey that mostly includes respondents who identify as White, have at least some college education, and rate their general health status as good or very good. Asians are underrepresented in the database, as are older, less well-educated individuals [24]. Our study is the first to look closely at this population and provide details regarding their cancer beliefs, cancer screening and health-seeking behaviors. Specifically, we report a previously undescribed relationship between cancer fatalism and positive health-information seeking and screening behaviors that may be unique to this cultural community. Our results will hopefully help lead to improving healthcare information distribution and uptake for an underserved Chinese American immigrant population.

Author Contributions All authors contributed to the study conception and design. Material preparation and data collection were performed by LT, IL, and CO. Data analysis was performed by XMG and KZ. The first draft of the manuscript was written by XMG and all authors commented on subsequent versions of the manuscript. Supervision of the project was performed by MS.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The questionnaire and methodology for this study was approved by the Institutional Review Board of Northwestern University (ID: STU00059420).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

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