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Research Article

A Community-Based Survey of Colorectal Cancer Screening Behaviors in Chinese Immigrants Residing in a Major Metropolitan Area

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Abstract

Background: Colorectal cancer is a common cause of screening preventable death in Chinese immigrants, but colorectal cancer screening rates remain low in this population. This study evaluated factors associated with colorectal cancer screening behaviors in Chinese Americans living in New York City. **Methods:** Participants were foreign-born Chinese Americans, aged 50 years or older, who completed internet surveys between November 2020 and May 2021 regarding their colorectal cancer screening behaviors. Data were collected on demographics, health care utilization, participants' levels of health literacy, English proficiency, colorectal cancer perceptions and current colorectal cancer screening behaviors. Bivariate analyses using chi-square or t-tests were performed to examine associations between colorectal cancer screening behaviors and participant characteristics. **Results:** 103 participants were surveyed with a mean age of 71.3 years. Most participants experienced high rates of socioeconomic disadvantage (i.e., less than a high school education, annual household income <$20,000, limited health literacy, and poor English proficiency). 92% were ever screened, 81% were up-to-date on screening, and 85% expressed intention to screen in the future. Almost all participants had a primary care provider and a language concordant provider. Individuals who intended to screen were more fearful of developing colorectal cancer (3.2 vs 2.8, p=0.02) and perceived a colorectal cancer diagnosis with greater severity (3.0 vs 2.7, p=0.07) than those without intention to screen. **Conclusions:** In our sample, Chinese immigrants were adversely impacted by multiple social determinants of health but reported high colorectal cancer screening rates. Community-based outreach is critical to ensuring cancer-screening engagement in medically vulnerable populations.

Keywords: Colorectal cancer; Chinese immigrants; Cancer screening

Introduction

As the fastest growing racial group, Chinese Americans are the largest Asian origin group with 5.2 million people in the United States (U.S.) [1,2]. Immigration, rather than native births, has propelled the rapid rise of the Asian American population, with nearly 70% of Chinese Americans born outside of the U.S. [3,4]. Foreign-born Chinese Americans represent a distinct cohort who are adversely impacted by the social determinants of health (e.g., more likely to lack health insurance or live in poverty, and less likely to have English proficiency or graduate from high school) and under-report health services utilization (e.g., cancer screening), leading to persistent health disparities [4-7].

It is estimated that by 2030, cancer incidence among Asian Americans will increase by 132%, versus 64% for non-Hispanic black and 31% for non-Hispanic white Americans [8]. In contrast to other racial and ethnic groups, cancer remains the top cause of death in Chinese Americans, and screen-detectable cancers are a common cause of preventable death [9-11]. Cancer disparities are exacerbated by nativity, as Chinese immigrants experience more advanced stage cancers, worse survival, and report lower cancer screening rates than native born Americans [12-15].

Despite their exponential growth, Asian Americans are aggregated in most clinical and epidemiological research, obscuring important differences with regards to risk factors, lifestyle practices, and health behaviors among specific Asian sub-groups [16]. Colorectal cancer (CRC) remains a leading cause of screening preventable death in Chinese Americans, with most CRCs diagnosed at later stage with poorer overall prognosis [9,17]. Despite these alarming trends, there is a paucity of data detailing CRC screening behaviors in this ethnic group. Herein, we performed a cross-sectional, community-based study of factors associated with ever, up-to-date, and intent-to-screen status among Chinese immigrants residing in New York City (NYC), the largest Chinese enclave in the U.S. [18].

Methods

Study Participants and Data Collection

An anonymous survey was administered via the internet to eligible participants between November 2020 and May 2021. Participants were eligible if they self-reported as: born in China, age 50 years or older, currently residing in NYC, and able to read in simplified Chinese or English. Participants were recruited via postings and announcements at Chinese-serving community organizations, Chinese community listservs, and through snowball sampling methods. Interested participants clicked a link to the survey on REDCap, which provided them with an option to complete the survey in either Chinese or English. No compensation or incentives were provided to the participants. This study was deemed exempt by the Institutional Review Board at the Icahn School of Medicine at Mount Sinai.

Measures

Our outcome measures of interest included: 1) "Ever screened," defined as ever having received any type of CRC screening (e.g., stool-based testing, colonoscopy); 2) "Up-to-date with screening," defined as having had a stool-based test (i.e., fecal immunochemical test) for CRC within the past 12 months or having had a colonoscopy within the past 10 years; and 3) "Intent to screen," defined as intending to have any CRC screening in the future.

We also collected data on participants' age, gender, marital status, language preference, primary care provider status, language concordance with primary care provider, health insurance status, education level, household income, Chinese region of origin, NYC neighborhood, and number of years residing in the U.S. In addition, we measured participants' level of health literacy [19] and English language proficiency [20]. Beliefs about CRC were assessed with the validated, Colorectal Cancer Perceptions Scale [21], which includes 35 questions regarding susceptibility (i.e., probability of developing CRC in the future), severity (i.e., the negative impact of CRC on an individual's life), benefits of CRC screening, and barriers to CRC screening. Items are rated on a 1- (strongly disagree) to 5- (strongly agree) point Likert scale.

Statistical Analysis

We conducted univariate analysis to produce a profile of the study sample and employed chi-square tests and t-tests, as appropriate, to evaluate bivariate associations between our outcome measures and participant characteristics, health literacy, English language proficiency, and CRC perceptions. For bivariate associations, we determined statistical significance at $p < 0.05$. All analyses were conducted in SAS 9.4.

Results

Our sample included 103 participants whose mean age was 71.3 years (Table 1). Sixty-one percent of participants identified as female and 73% were married. Seventy-five percent of participants had less than a high school education, 95% reported an annual household income <$20,000, and 93% had public health insurance. All of our participants were born in China, with the majority emigrating from Guangdong and Fujian provinces. Less than 10% were recent immigrants (resided in the U.S. for <10 years). Sixty-one percent spoke Cantonese as their primary language and the vast majority (>90%) endorsed poor English speaking, writing,

and reading capabilities. While 77% of individuals had limited health literacy, 99% had a primary care physician (PCP) and all but 2 participants had a language concordant PCP. In our study population, 92% had been screened for CRC, 81% were up-to-date with CRC screening, and 85% expressed intention to screen for CRC in the future. Among the 8 participants who had never been screened, 6 (75%) expressed future intent to screen. Among the 21 participants who were not up-to-date with screening, 16 (76%) intended to screen again.

	n	%[a]
Age (n, $\bar{x}$)	91	71.32
Gender		
Female	63	61
Male	40	39
Married		
Married	79	73.15
Not married	24	26.85
Cantonese vs. Non-Cantonese		
Cantonese	61	59.80
Non Cantonese	41	40.20
Has PCP or Usual Source of Care		
Yes	101	99.02
No	1	0.98
Concordant Language PCP		
Yes	101	98.06
No	2	1.94
Health Insurance		
Public	96	93
Private	7	7
Education		
Less than high school	78	75.73
High school or more	25	24.27
Annual Household Income		
Less than $15,000	60	58.80
$15,000 to $19,000	37	36.27
$20,000 or more	5	4.93
Region of Origin		
Fujian	29	28.20
Guangdong	57	55.30
Other areas of China	17	16.50
Neighborhood		
Manhattan Chinatown	45	43.70
Manhattan, Other	41	39.80
Outer Boroughs	17	16.50
Years in US		

9 years or less	9	8.74
10 or more years	94	91.26
Health Literacy		
Not Limited	24	23.30
Limited	79	76.70
English-Speaking Ability		
Poor	92.16	94
Fair	4	3.92
Good	4	3.92
English-Writing Ability		
Poor	96	93.20
Fair	4	3.88
Good	3	2.91
English-Reading Ability		
Poor	95	92.23
Fair	4	3.88
Good	4	3.88
Ever Screened for CRC		
Yes	95	92.23
No	8	7.77
Up-to-date with CRC Screening		
Yes	87	80.56
No	21	19.44
Intends to Screen for CRC		
Yes	92	85.19
No	16	14.81
[a]: unless otherwise noted; PCP: Primary Care Provider; CRC: Colorectal Cancer		

Table 1: Characteristics of the study sample.

We performed bivariate analyses (Table 2) to assess the associations between sociodemographic characteristics and CRC screening behavior (i.e. ever, up-to-date, and intent to screen). Cantonese-speaking individuals were less likely to have ever been screened (87% vs 100%, p = 0.02), but when asked about intention to screen, this difference did not persist. In our cohort, the factors associated with up-to-date CRC screening were public health insurance (p = 0.01), less than a high school education (p = 0.01), and limited health literacy (p = 0.02). Those who were married (p = 0.07) and who spoke non-Cantonese dialects (p=0.06) were marginally more likely to be up-to-date with CRC screening. No sociodemographic variable was associated with intent-to-screen.

	Ever Screened			**Up-to-Date**			**Intent to Screen**	
Variables	n	%[a]		n	%[a]		n	%[a]
Age (n, $\bar{x}$)	83	71.43		76	71.49		79	71.06
Gender								
Female	59	93.65		51	80.10		52	82.50
Male	36	90		36	90		35	87.50
Married								
Married	73	92.40		67	84.80	*p=0.07*	67	84.80
Not married	22	91.70		20	69		25	86.20
Cantonese vs. Non Cantonese								
Cantonese	53	86.89	*p=0.02*	48	78.69	*p=0.06*	52	82.93
Non Cantonese	41	100		38	92.68		34	85.25
Health Insurance								
Public	89	92.71		82	85.40	*p=0.01*	81	84.40
Private	6	85.71		5	41.70		11	91.70
Education								
Less than high school	73	93.59		69	88.50	*p=0.01*	69	88.50
High school or more	22	88		18	60		23	76.70
Region of Origin								
Fujian	29	100		27	93.10		22	75.86
Guangdong	50	87.72		44	77.20		50	87.72
Other areas of China	16	94.12		16	94.10	*p=0.08*	15	88.24
Neighborhood								
Manhattan Chinatown	41	91.11		39	86.70		39	86.70
Manhattan, Other	38	92.68		34	82.90		35	85.40
Outer Boroughs	16	94.12		14	82.40		13	76.50
Years in US								
9 years or less	9	100		8	88.89		9	100
10 or more years	86	91.49		79	84.04		78	82.98
Limited Health Literacy								
Not limited	22	91.67		19	65.52	*p=0.02*	24	82.76
Limited	73	92.41		68	86.08		68	86.08
[a]: Unless otherwise noted								

Table 2: Sociodemographic associations with colorectal cancer screening behavior.

We also evaluated associations between CRC perception scores and CRC screening behaviors (Table 3). Participants who reported intent to undergo CRC screening were more fearful of developing CRC (3.2 vs 2.8, p = 0.02) than those without intention to screen. Similarly, the perceived severity of a CRC diagnosis was marginally greater in those who intended to screen (3.0 vs 2.7, p = 0.07) compared to those without intention to screen.

	Susceptibility Score		Severity Score		Benefits Score		Barriers Score		Fear Score		Life Impact Score	
	n	$\bar{x}$	n	$\bar{x}$		$\bar{x}$	n	$\bar{x}$	n	$\bar{x}$	n	$\bar{x}$
Ever Screened												
No	8	3.6750	8	2.9583	7	2.2286	7	3.5055	8	3.1500	8	2.8214
Yes	91	3.7956	86	2.9797	91	2.0901	87	3.5561	91	3.1714	87	2.8243
Up-to-Date with Screening												
No	15	3.9733	16	3.0417	15	2.4533	15	3.6359	16	3.2000	16	2.9286
Yes	84	3.7524	78	2.9647	83	2.0361	79	3.5365	83	3.1639	79	2.8029
Intends to Screen												
No	14	3.6571	14	2.7440	14	2.1143	13	3.4320	15	2.8133	14	2.6939
Yes	85	3.8071	80	3.0188	84	2.0976	81	3.5717	84	3.2333	81	2.8466

Table 3: Associations between Colorectal Cancer Perceptions Scale and colorectal cancer screening behaviors.

Discussion

Despite national guidelines recommending CRC screening for Americans age 45 years and older, substantial disparities remain by race/ethnicity, nativity, socioeconomic status, acculturation level, and English language proficiency [22-26]. The present study illustrates important lessons regarding CRC screening utilization in an urban, foreign-born, and historically underserved community. Much to our surprise, a majority of surveyed individuals reported being up-to-date with CRC screening (81%) despite prior studies suggesting poor CRC screening rates (26-41%) among Chinese Americans [14,27].

Our sampled population is adversely impacted by several social determinants of health: most participants had limited English proficiency, had less than a high school education, lived below the federal poverty line, and reported limited health literacy. Despite being heavily disadvantaged, over 99% of participants reported having a usual source of care, which has been associated with regular and timely use of primary and preventive care [28]. It is important to note that participants in our study were mainly recruited from a partnered community site with linguistic and culturally-concordant staff who regularly assist community members in obtaining social and health services (e.g., applying for health insurance, enrolling in free cancer screening services through New York State Cancer Services Program) [29]. Social workers, lay or community health workers, and patient navigators are commonly employed by community centers and can aid members in overcoming sociocultural and structural obstacles to care. Several studies show that these outreach efforts are able to effectively engage vulnerable communities and enhance cancer screening participation in minoritized populations [30-37].

Notably, over 98% of participants reported having a language concordant PCP, which may have also contributed to the high CRC screening adherence rates observed in our cohort. Physician recommendation is consistently cited as one of the strongest facilitators of CRC screening uptake and persists in studies evaluating racial and ethnic minority groups [22,38-40]. The achievement of >80% CRC screening completion, which surpassed national objectives set by the National Colorectal Cancer Roundtable and Healthy People 2030, is remarkable considering the degree of disadvantage endorsed by this entirely immigrant community [41,42].

Foreign-born status is another important health indicator and prior studies demonstrate varying health behaviors and outcomes among this cohort, with foreign-born individuals reporting lower CRC screening participation [43,44]. In a recent, cross-sectional analysis of CRC screening behaviors among foreign-born Americans, adherence to CRC screening was worse in foreign-born compared to native-born Asian Americans, regardless of years lived in the U.S. [45]. Among foreign-born, non-Hispanic white and black Americans, recent immigration (<15 years) was associated with decreased CRC screening [23]. U.S. immigrants frequently encounter several healthcare obstacles, related to lack of health insurance, limited English proficiency, lack of U.S. citizenship, and differences in cultural norms [45,46]. Our study underscores the notion that among underserved or foreign-born individuals, linkages with trusted community stakeholders are critical for navigating the healthcare system and ensuring equitable healthcare access.

Our study has a number of strengths and limitations. While prior studies focused on colonoscopy use or CRC screening trends in large healthcare systems [47,48], our study directly sampled foreign-born, Chinese community members, a historically marginalized and medically underserved group, about their screening practices. NYC remains the largest Chinese enclave in the U.S, and continues to experience rapid growth of the Asian population [4,18]. Thus, our study provides important regional perspectives on CRC screening practices that likely varies from patterns observed in other areas of the country, such as enhanced community engagement with social services. Our analyses are limited by a small sample size, and the cross-sectional nature impacted our ability to observe longitudinal changes in screening behaviors, particularly whether intention to screen manifested in screening completion. Our survey was administered through the internet, which may have led to a potential selection bias, although our population reported low health literacy and English proficiency. Outcomes were also based on self-report which could have been impacted by a social desirability bias and we were unable to confirm CRC screening completion.

Conclusions

While our findings may not be generalizable to Chinese immigrants residing in other regions of the U.S., they are noteworthy from a public health standpoint. Despite being disadvantaged by several social determinants of health, our cohort reported higher adherence to CRC screening, likely bolstered by ties to neighborhood community centers offering critical support services in their preferred language and with language concordant providers that may have enabled greater healthcare engagement. Since the start of the COVID-19 pandemic, cancer screening participation has decreased, with the steepest decline observed among Asian Americans [49]. Now more than ever, policy and public health efforts must align with community partners to design culturally-sensitive, community-engaged cancer mitigation strategies if we are to make meaningful strides towards cancer screening equity.

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Ethical Guidelines

This study was exempt by the Mount Sinai Institutional Review Board at the Icahn School of Medicine.

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