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Recruitment and retention of Chinese men at high risk for lung Cancer: Lessons learned from a pilot trial of a community health worker intervention to increase lung cancer screening uptake

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ABSTRACT

Background: The U.S. Preventive Services Task Force (USPSTF) currently recommends annual lung cancer screening (LCS) with low-dose computed tomography (LDCT) for asymptomatic 50- to 80-year-old adults with a 20-pack year history who currently smoke or have quit smoking within the past 15 years. Foreign-born Chinese livery drivers are a group at disproportionately high risk for lung cancer due to high smoking prevalence and occupational exposure to airborne contaminants and carcinogens. This paper describes a pilot randomized controlled trial to educate and navigate high-risk, previously unscreened Chinese livery drivers to lung cancer screening, and describes barriers to recruitment and retention.
Study design: Pre-pilot and pilot randomized controlled trial.
Methods: The study was conducted in two phases, a pre-pilot and pilot randomized controlled trial between December 2019 and June 2023. In the pilot RCT, eligible participants were randomized to either (1) the CHW (Community Health Worker) intervention group or (2) a written materials only control group and participated for 6–12 months.
Results: From December 2019 to June 2023, 25 subjects were enrolled: 12 in Phase 1 and 13 in Phase 2 (of 1018 approached). Recruitment barriers included the COVID-19 pandemic, institutional mistrust, smoking-related beliefs, and primary care provider-related barriers.
Conclusions: We identified specific socioenvironmental and cultural barriers to LCS uptake among Chinese immigrant men who smoke. Farther upstream cancer education interventions (e.g., provider and community-level education initiatives on LCS) conducted in partnership with community-based organizations should be considered to meet the needs of this population.

1. Introduction

Lung cancer is the second most diagnosed cancer and the leading cause of cancer death in the U.S. for both men and women [1]. Of all lung cancer cases, 80 % are directly caused by cigarette smoking [1]. Despite the overall decline in U.S. smoking rates, smoking prevalence remains high in some subpopulations, including Chinese American men. Foreign-born Chinese livery drivers may be at even greater lung cancer risk due to a combination of high smoking prevalence as well as occupational exposures to carcinogens, with 73 % of Chinese livery drivers in New York City (NYC) reporting current or former smoking [2].

The U.S. Preventive Services Task Force (USPSTF) currently recommends annual lung cancer screening (LCS) with low-dose computed tomography (LDCT) for asymptomatic 50- to 80-year-old adults with a 20-pack year history who currently smoke or have quit smoking within the past 15 years [3]. Yet LCS uptake remains low: from 2018 to 2019, only 5 % of eligible individuals completed LCS [4]—vs. >70 % of U.S. women meeting USPSTF guidelines for breast and cervical cancer

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screening and 54 % of U.S. men and women meeting USPSTF recommendations for colorectal cancer screening [5]. Given disproportionately low uptake of LCS and other cancer screenings among Asian Americans [6], tailored outreach to increase utilization of potentially lifesaving LCS in the Chinese community is urgently needed.

We conducted a pilot randomized controlled trial (RCT) of a community-engaged intervention to educate and navigate high-risk, previously unscreened Chinese livery drivers in NYC [7,8] to LCS. This report describes challenges we encountered in recruiting and retaining participants, to inform future strategies in conducting community-based cancer control programs in this underserved group.

1.1. CHW intervention

The intervention was culturally and linguistically adapted from an existing intervention successfully utilized with the general taxi driver population to increase primary care access. Trained study staff fluent in Mandarin and Cantonese served as community health workers (CHWs). CHWs facilitated shared decision making (SDM) with primary care providers (PCPs) and LCS (if appropriate) for participants, providing navigation as needed, from finding a PCP, scheduling appointments with PCPs or for LCS, assisting with insurance barriers and clinic paperwork, to following up on results (if indicated). CHWs maintained regular contact with participants (by phone or in person at least every month and more), provided PCP/LCS appointment reminders, and assisted with any barriers to attendance. CHWs provided the following resources: (1) written informational materials on SDM and LCS: a decision aid for LCS; a fact sheet on smoking, lung cancer and LCS; and the latest USPSTF guidelines on LCS with LDCT; (2) a PCP letter confirming participants' eligibility and interest in completing SDM and LCS; (3) a Patient Communication Guide to facilitate communication with PCPs; and (4) a collection of resources for PCPs, including USPSTF guidelines on LCS, evidence backing LCS recommendations, and information on insurance coverage for LCS.

2. Methods

The study was conducted in two phases, a pre-pilot and a pilot randomized controlled trial (RCT), between December 2019 and June 2023, in NYC. In the pre-pilot, participants received CHW navigation for three months and provided feedback to inform further refinement of the intervention manual, which was utilized in the pilot RCT. In the pilot RCT, eligible participants (i.e., male livery drivers of Chinese descent, aged 50–80 years old, with a 20-pack year smoking history, and had not completed LDCT in the past year) were randomized to either (1) the CHW intervention group, or (2) the written materials only control group, and participated for 6–12 months. Participants received $30 (in the pre-pilot) or $40 (in the pilot RCT) upon completion of the intake survey and $60 upon completion of the exit survey. Pilot RCT outcomes were feasibility (i.e., study retention rate) (*primary outcome*) and preliminary effectiveness (i.e., LCS completion rate, participant satisfaction) (*secondary outcomes*) of the CHW intervention.

3. Results

In the pre-pilot, 12 drivers enrolled (target n = 10), 3 of whom completed LCS with CHW assistance. Of the remaining 9 drivers, 5 were refused LCS referrals by their PCPs due to lack of awareness of USPSTF guidelines or insurance coverage, 2 were no longer interested in LCS, 1 had initiated smoking cessation and no longer saw the need for LCS, and 1 was fearful of visiting health facilities due to the COVID-19 pandemic. In the pilot RCT, we approached 1018 individuals and consented 13 (target n = 50), despite expanding our eligibility criteria to include non-livery driver occupations and including numerous community sites for recruitment. Of the 13, 11 participants completed baseline surveys (n = 2 withdrew), and 9 (69 %) completed exit surveys (Table 1).

Table 1
Sociodemographic characteristics of the sample (N = 25).

Variable	Phase 1 Pre-pilot (n = 12)	Phase 2 Pilot RCT (n = 13)
	M (SD)	*M (SD)*
Age	60 (3.646)	64 (6.976)
Years in the U.S.	15 (5.456)	23 (14.406)
Household monthly income	2869 (3074.414)	1367 (703.562)
	N (%)	N (%)
Country of birth		
Mainland China	11 (91.7)	11 (84.6)
Hong Kong	0	1 (7.7)
Taiwan	1 (8.3)	1 (7.7)
Marital Status		
Married	8 (72.7)	9 (81.8)
Divorced	3 (27.3)	2 (18.2)
Missing	1	2
Education level		
Below high school	1 (9.0)	8 (66.7)
High school graduate	5 (45.5)	2 (16.7)
Some college/college graduate	5 (45.5)	2 (16.7)
Missing	1	1
English Proficiency		
Limited English proficient	11 (100)	10 (83.3)
English proficient	0	2 (16.7)
Missing	1	1
Food Security		
Food insecure	1 (9.1)	3 (27.3)
Food secure	10 (90.9)	8 (72.7)
Missing	1	2
Occupation		
Taxi driver	11 (91.7)	5 (38.5)
Restaurant worker/cook	0	3 (23.1)
Delivery worder (bicycle)	1 (8.3)	0
Missing	0	5
Employment Status		
Employed	11 (100)	6 (54.5)
Unemployed	0	1 (9.1)
Retired	0	4 (36.4)
Missing	1	2
Income enough to meet the basic needs?		
Yes	10 (90.9)	7 (77.8)
No	1 (9.1)	2 (22.2)
Missing	1	4
Insurance Status		
Insured	11 (100)	10 (100)
Missing	1	3
Insurance type		
Fidelis Care – Medicaid Managed Care	4 (50.0)	3 (60.0)
Healthfirst – Medicaid Managed Care	3 (37.5)	1 (20.0)
Medicaid and Medicare	1 (12.5)	1 (20.0)
Missing	4	8
Primary Care Physician (PCP) status		
Has a PCP	11 (100)	10 (100)
Missing	1	3

Since we were unable to recruit 50 participants to the RCT, we were unable to assess feasibility (*primary outcome*). Five of six participants (83 %) randomized to the intervention completed LCS vs. 0 of 5 randomized to the control group (*secondary outcome*). The majority of participants (89 %) were satisfied with the intervention (*secondary outcome*).

4. Discussion

Below, we discuss several barriers we encountered in recruitment and retention.

4.1. COVID-19-related barriers

The initial outbreak of the COVID-19 pandemic in NYC coincided with our recruitment period. Many drivers quit or retired during the

pandemic, and numerous livery bases went completely remote, limiting our ability to conduct in-person outreach. Chinese livery drivers were at high risk for poor COVID-19 outcomes. A study utilizing EMR data from over 85,000 patients who sought care in the NYC Health & Hospitals system from March–May 2020 showed Chinese New Yorkers had higher COVID-19 death rates than any other group (36 %) and were 1.44 times more likely to die from the disease than non-Hispanic White patients [9]. Social drivers of health may have contributed to the high COVID-19 mortality rates in the Chinese community, such as residing in multi-generational households, delay in seeking care due to concerns about documentation status, and employment in public-facing occupations, such as restaurant work and taxi driving [9]. Since the emergence of COVID-19, Chinese and other Asian Americans have experienced increased anti-Asian harassment, which may also have been related to an increased reluctance to participate.

4.2. Institutional mistrust

Numerous men declined to participate due to a fear of Chinese-language scams that had reportedly become more commonplace since the pandemic (e.g., false notifications of problems with passports, immigration status, and bank accounts). Others did not trust in the confidentiality of the research process and declined because they feared being reported to authorities due to their undocumented immigration status, despite study staff using a verbal consent process rather than a written consent document. Individuals described a preference for relying on trusted friends and family for referrals to healthcare services and governmental aid, echoing prior literature suggesting that Chinese immigrants, particularly the undocumented, lack trust in medical and governmental institutions [10]. While CHWs were ethnically Chinese and bilingual, participants shared that lack of familiarity with Memorial Sloan Kettering Cancer Center contributed to hesitancy in participating.

4.3. Smoking-related beliefs and Fatalism

Some men stated they "did not need" the CHW program due to being uncertain that there was a link between smoking and lung cancer in the first place, echoing our prior qualitative work with Chinese livery drivers, who cited well-known Chinese leaders who were long-term smokers yet remained healthy (e.g., Mao Zedong, Deng Xiaoping) to express their doubt about whether smoking caused cancer [8]. Some described smoking as an important part of socializing, consistent with previous findings indicating one's social network is the greatest perceived barrier to cessation among Chinese immigrant smokers [2]. This was observed throughout the recruitment process where approached individuals were often smoking in pairs or groups. Some community members also expressed fatalistic beliefs regarding their smoking history, e.g., stating they "would not care" if they got cancer since their lungs were "all black already," or that they were already in their "twilight" years, suggesting they felt it was too late to intervene and that completing LCS was therefore an unnecessary burden.

4.4. Primary care provider (PCP) – related barriers

Some who successfully enrolled in the study faced PCP-related barriers to completing LCS. As part of the intervention, CHWs gave participants a letter to give to their PCPs to inform them of their eligibility and interest in completing LCS. However, some were incorrectly told by providers that they did not need LCS or that it would use up their health insurance funds for the year, even when covered by both Medicaid and Medicare. Some PCPs were unaware of the USPSTF screening guidelines and insurance coverage or had incorrect information about their patients' smoking pack year history.

5. Conclusions

We learned several key lessons from our efforts implementing a LCS education and navigation program among Chinese livery drivers in NYC: (1) while study team members were bicultural and bilingual and we utilized a community-engaged approach, we lacked sufficient community buy-in; and (2) socioenvironmental factors (i.e., institutional mistrust, uncertainty about the link between smoking and lung cancer, and provider gaps in LCS knowledge) posed additional barriers to uptake. Cancer control researchers should consider a true community-based participatory research model with local Chinese-serving community-based organizations to co-develop and co-deliver interventions farther upstream, such as provider education initiatives on LCS and community education and awareness initiatives related to smoking, lung cancer and LCS.

Consent to participate

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

Author contributions statement

J. Leng was involved in the conceptualization, methodology, investigation, and writing of the manuscript, as well as revision and editing, supervision, and funding acquisition; F. Lui contributed formal analysis, original draft preparation, revision, and editing; C. Chan contributed to methodology and investigation; R. Yan Chen contributed to investigation and original draft preparation; M. Wu contributed to data curation and formal analysis; B. Narang contributed to project administration and supervision; F. Gany contributed to funding acquisition, conceptualization, and supervision.

Ethics approval

This study was approved by the Memorial Sloan Kettering Cancer Center Institutional Review Board.

Consent for publication

Consent for the publication of de-identified data was obtained from all individual participants included in the study.

Availability of data and material

The data that support the findings of this study are available from the corresponding author [JL], upon reasonable request.

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Conflicts of interest

The authors have no relevant financial or non-financial conflicts of interest to disclose.

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