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## Acceptability of a community health worker intervention to improve the oral health of older Chinese Americans: A pilot study

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### Abstract

**Objective:** To evaluate the acceptability of a community health worker (CHW) intervention designed to improve the oral health of low-income, urban Chinese immigrant adults.

**Background:** Given that both dental caries and periodontitis are behaviourally mediated, biofilm-based diseases that are largely preventable with attention to regular oral hygiene practices and preventive dental visits, strategies to arrest or even heal carious lesions and high-quality maintenance care and plaque control without the need to resort to aerosol-generating surgical approaches are evidence-based best practices. Older immigrants have poorer oral health than older US-born natives, motivating the need for delivery of more effective and affordable services to this vulnerable population.

**Materials and Methods:** CHWs were trained by the NYU College of Dentistry dental hygienist faculty members using dental models and flip charts to instruct patients on proper brushing and

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#### AUTHORS' CONTRIBUTION

The first author (MEN) conceptualised the study and wrote the manuscript. The second author (YW) conducted the analyses and interpreted the data. The third author (ABT) contributed biostatistical expertise and supervised the analyses. The fourth, fifth and sixth authors (DM, RL, LJJ) collected the data and contributed community-based participatory research expertise. The seventh author (SSM) co-designed the study and contributed urban health expertise. The eighth author (SSS) conducted research and contributed oral health expertise. The ninth author (SY) co-designed the study and contributed methodological expertise. All authors reviewed drafts of the manuscript and take public responsibility for its content.

#### CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

#### DATA AVAILABILITY STATEMENT

The authors will make completely de-identified data sets (ie data sets that have been cleaned of all 18 types of Health Insurance Portability and Accountability Act identifiers) available to interested investigators who submit a written request to the first author. The only contingency on the use of the data sets will be that ethical guidelines be followed (eg only individuals who have completed a research ethics training course will have access to the data sets, and the data sets will be stored with appropriate security safeguards).

flossing techniques. In addition, they discussed the presented oral health promotion information one-on-one with patients, addressed any expressed concerns and encouraged prevention of oral conditions through regular dental visits and brushing with fluoride toothpaste.

**Results:** More than 98% of the 74 older Chinese adult participants strongly agreed/agreed that the CHWs helped them to improve how they take care of their health, the CHWs answered their questions and concerns, the information and topics were informative, and the in-person demonstrations were helpful in improving oral health.

**Conclusion:** The health of all communities depends on access to comprehensive care, including oral health care, in the wake of COVID-19. CHW interventions are acceptable to and may reach marginalised and immigrant communities.

## Keywords

Chinese Americans; community health workers; older adults; oral health equity

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## 1 | INTRODUCTION

Among adults aged 65 years and older, tooth loss largely decreased between 1999 to 2004 and 2011 to 2016 for all noninstitutionalised older adults who participated in the US National Health and Nutrition Examination Survey (NHANES).<sup>1</sup> Nonetheless, disparities between low- and higher-income older adults persisted over time. For instance, the prevalence of edentulism remained nearly three times as high among low- vs. higher-income older adults (28.6% vs. 9.9%), and the prevalence of untreated tooth decay remained nearly three times as high among low- vs. higher-income older adults (28.6% vs. 9.9%).<sup>1</sup>

Older Chinese immigrants are a unique subgroup of older adults who face numerous challenges that may preclude them from receiving regular preventive oral health services. Language barriers, diminished socioeconomic status, disruption of social networks and demands for cultural adaptation may all negatively impact their ability to achieve or maintain oral health.<sup>2</sup> Individuals who immigrate later in life may be more likely to fare worse than individuals who immigrate early in life, due to the increased risk of linguistic difficulties, cultural barriers, disruptions in employment, limited retirement incomes/benefits and loss of social standing.<sup>3,4</sup> If left untreated, chronic oral conditions (eg dental caries and periodontitis) are largely irreversible and cumulative.<sup>5</sup>

Community members serving as frontline health workers are referred to by several names, including community health workers (CHWs), community aides, *promotores de salud*, *promotoras*, lay health workers and patient navigators.<sup>6–8</sup> A fundamental attribute of these individuals is that they are indigenous to the community in which they work—ethnically, linguistically, socioeconomically and experientially—providing them with a unique understanding of the norms, attitudes, values and strengths of community members and access to hard-to-reach populations.<sup>7,9</sup> The various roles of CHWs include helping individuals navigate the health care system, providing cultural linkages, overcoming distrust, contributing to and building patient-provider communication and increasing the likelihood of patient follow-up.

Upon successfully utilising a CHW approach in a local Sikh American oral health project,<sup>10,11</sup> the study team was awarded funding from the National Institute of Dental and Craniofacial Research (NIDCR) of the US National Institutes of Health (NIH) to conduct a participatory, multi-level, dynamic intervention in urban outreach centres to improve the oral health of low-income Chinese Americans.<sup>12</sup> The objective of the present study is to evaluate the acceptability of a CHW intervention designed to improve the oral health of low-income, urban Chinese immigrant adults.

## 2 | METHODS

Before the COVID-19 pandemic disrupted life around the globe, the NYU College of Dentistry, located in lower Manhattan, New York, NY, USA, held volunteer screening events an average of three times per week, on weekdays and weekends, with six to eight dental students typically taking part in each event. Although they do not directly treat patients at these community sites, dental students refer many of the screening attendees to the NYU College of Dentistry. They also deliver a group educational session using audiovisual materials that covers topics such as the importance of oral health to general health, the benefits of tobacco cessation, alcohol moderation, and sound dietary practices in attaining and maintaining oral health, and the value of proper fitting and care of oral prostheses in promoting oral health quality of life. To encourage patients to visit a dentist, students provide each patient screened with a voucher worth \$205.00 for oral health care at the NYU College of Dentistry to cover her/his comprehensive oral examination, treatment plan and prophylaxis at no charge and with no co-payment required.

Rather than simply supply patients with soft-bristled tooth-brushes, fluoride toothpaste and dental floss at these outreach events, CHWs were trained by the NYU College of Dentistry dental hygienist faculty members using dental models and flip charts to individually instruct patients on proper brushing and flossing techniques. This was intended to add value to the multifaceted outreach efforts to encourage older Chinese immigrants to visit a dentist where further prevention and treatment services are available, since use of models and charts by CHWs was endorsed by Sikh participants in a previous community-based oral health promotion project.<sup>10,11</sup> Three CHWs discussed the presented oral health promotion information one-on-one with patients while they awaited screening by a dental student, usually for 5–10 minutes, but lasting for as long as a patient desired instruction. In particular, the CHWs addressed any expressed concerns and encouraged prevention of oral conditions through regular dental visits and brushing with fluoride toothpaste.<sup>12</sup>

### 2.1 | Patient exit interviews

This study received approval from the NYU Grossman School of Medicine Institutional Review Board (study s17–01077). All Health Insurance Portability and Accountability Act safeguards were followed.

At the end of each outreach event, patients who signed consent forms to participate in the study completed a patient exit interview (PEI)<sup>13</sup> regarding the acceptability of the intervention and self-efficacy around oral health behaviours that was adapted from an instrument used in a previous community-based oral health promotion project<sup>10</sup> and

provided permission to the project CHWs to contact their regular dental providers regarding receipt of follow-up dental visits. We developed four statements on patient satisfaction with the CHW intervention, and patients were asked the extent to which they agreed with each statement, for example “The community health worker(s) helped me to improve how I take care of my health: strongly agree, agree, disagree or strongly disagree.” The a priori acceptability criterion of the intervention was that 80% or more of patients would rate all four administered acceptability questions as “strongly agree” or “agree.”

## 2.2 | Data analysis

For descriptive statistics, continuous variables were summarised with means and standard deviations and categorical variables were summarised with counts and percentages. The Fisher exact test for categorical variables with missing values excluded was used to compare the distributions of variables both from the exit interviews to the 1-month follow-up calls for the subset of participants who were contacted and responded and for the self-efficacy of participants immediately before and right after the CHW intervention.

## 3 | RESULTS

A total of 74 patients participated in the acceptability study, all of whom self-reported as Asian and spoke Chinese as their preferred language (Table 1).

More than 98% of participants strongly agreed/agreed with the four aspects of the CHW intervention (Table 2).

In particular, the participants strongly agreed/agreed that the CHWs helped them to improve how they take care of their health, the CHWs answered their questions and concerns, the information and topics were informative, and the in-person demonstrations were helpful in improving oral health.

Among the 45 participants who completed both surveys, there were no statistically significant differences in self-reported oral health practices from the exit interviews to the 1-month follow-up phone calls (Table 3).

Nonetheless, positive trends were observed from the exit interviews to the 1-month follow-up calls, for example, no participants reported only cleaning their teeth 2–6 times per week or less during the 1-month follow-up calls (down from 4.5% at the exit interviews), and more participants reported using both dental floss (from 33.3% to 46.7%) and a soft-bristled toothbrush (from 32.6% to 46.4%) over this 1-month time period.

Finally, the self-efficacy of participants improved from immediately before to right after the CHW intervention (Table 4).

In particular, a higher proportion of participants felt very confident/confident of being able to take good care of their mouths, teeth and gums ( $P < .001$ ) and asking their dentists or dental hygienists questions ( $P < .001$ ) after the CHW intervention.

## 4 | DISCUSSION

Even before the COVID-19 crisis, oral healthcare disparities for US older adults were widening between advantaged and disadvantaged members of society.<sup>14–16</sup> Millions of impoverished US older adults live in pain due to untreated oral health conditions such as dental caries and periodontitis, given their inability to access quality oral health care.<sup>17–19</sup>

In response, the NYU College of Dentistry instituted the *Local Community Outreach Programs* to reach underserved populations in local communities and link them to dental care, as needed and desired. The present study tested the acceptability of a CHW intervention to older Chinese patients and found that the CHWs and their in-person demonstrations improved participant understanding of the oral health promotion information delivered as well as their self-efficacy vis-à-vis taking good care of their mouths, teeth, and gums and asking their dentists or dental hygienists questions.

The findings reported here add to previous research in the extant literature on CHW interventions that improved oral health promotion in marginalised and immigrant communities.<sup>20,21</sup> Nonetheless, no statistically significant differences in self-reported oral health practices from the exit interviews to the 1-month follow-up phone calls were found. Indeed, a limitation of this pilot study is the small sample size, especially for completion of the 1-month follow-up phone calls. As of March 2020, all research activities were halted at New York University (NYU) in New York, NY, USA, so we ended enrolment on the current pilot study and analysed the data at hand. This may have precluded the ability to find statistically significant differences in self-reported oral health practices from the exit interviews to the 1-month follow-up phone calls, notwithstanding the positive trends noted. Additional limitations of this research include potential recall bias regarding the retrospective assessments and possible response bias associated with self-reported behaviours.

Oral health is essential to overall health and well-being, and improving the oral hygiene of older adults may even reduce the severity of SARS-CoV-2 infections.<sup>22</sup> Utilising the full array of oral health workforce models is especially important in the context of COVID-19, as many older adults find themselves increasingly isolated. By employing accessible and cost-efficient providers such as CHWs who can be deployed within the community, dental clinics and private practices may be better able to effectively serve older adult patients, especially those from underserved communities, while reducing the costs of delivered oral health promotion services and preventive care.<sup>23</sup> The NYU Langone Dental Medicine Postdoctoral Residency Program was recently funded by the Health Resources and Services Administration (HRSA) for a project to integrate dental, behavioural health and social services for disadvantaged populations across the life course. Next steps are to build upon the findings of the pilot study reported here by leveraging the considerable resources of the new HRSA award towards addressing the identified shortcomings of limited follow-up time and small sample size.

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**TABLE 1**

Sociodemographic characteristics of the study participants (N = 74)

<b>Characteristic</b>	<b>Descriptive Result</b>
Age (in years)	58.9 + 19.3
Gender	
Women	62 (84%)
Men	12 (16%)
Race	
Asian	74 (100%)
Ethnicity	
Non-Hispanic	74 (100%)
Preferred language	
Chinese	73 (100%)

*Note:* Continuous variables are presented as mean + standard deviation. Categorical variables are presented as n (%). Missing values are excluded from the analyses.



**TABLE 2**

Acceptability of the community health worker intervention (N = 74)

<b>Acceptability item</b>	<b>n (%)</b>
The community health worker(s) helped me to improve how I take care of my health	
Strongly Agree	21 (29.2%)
Agree	50 (69.4%)
Disagree	1 (1.4%)
Strongly Disagree	0 (0.0%)
The community health worker(s) answered my questions or concerns	
Strongly Agree	16 (23.9%)
Agree	50 (74.6%)
Disagree	1 (1.5%)
Strongly Disagree	0 (0.0%)
The information and topics were informative	
Strongly Agree	17 (24.6%)
Agree	52 (75.4%)
Disagree	0 (0.0%)
Strongly Disagree	0 (0.0%)
The in-person demonstrations were helpful in improving oral health	
Strongly Agree	17 (24.6%)
Agree	52 (75.4%)
Disagree	0 (0.0%)
Strongly Disagree	0 (0.0%)

*Note:* Categorical variables are presented as n (%). Missing values are excluded from the analyses.

Self-reported oral health practices immediately following the community health worker intervention for all participants (N = 74) and at exit interview and 1-month follow-up for the subgroup of participants who were contacted and responded at 1-month follow-up (n = 45)

TABLE 3

	Follow-up Subgroup			P-value
	Overall	Exit Interview n (%)	1-month Follow-up n (%)	
<b>Oral Health Practices</b>				
How long has it been since you last visited a dentist or a dental clinic for any reason? Include visits to dental specialists, such as orthodontists.				0.88
Within the past year	47 (64.4)	27 (61.4)	28 (62.2)	
Within the past 2 years	9 (12.3)	7 (15.9)	9 (20.0)	
Within the past 5 years	8 (11.0)	5 (11.4)	5 (11.1)	
5 or more years	8 (11.0)	5 (11.4)	3 (6.7)	
Never	1 (1.4)	0 (0.0)	0 (0.0)	
How often do you clean your teeth?				0.46
2–6 times a week or less	5 (6.8)	2 (4.5)	0 (0.0)	
Once a day	5 (6.8)	2 (4.5)	2 (4.4)	
Twice or more a day	63 (86.3)	40 (90.9)	43 (95.6)	
Do you use any of the following to clean your teeth? (Check all that apply)				
Toothbrush	71 (95.9)	43 (95.6)	44 (97.8)	1.00
Wooden toothpicks	8 (10.8)	6 (13.3)	13 (28.9)	0.12
Plastic toothpicks	8 (10.8)	4 (8.9)	6 (13.3)	0.74
Thread (dental floss)	21 (28.4)	15 (33.3)	21 (46.7)	0.28
Charcoal	0 (0.0)	0 (0.0)	0 (0.0)	-
Chewstick/miswak	0 (0.0)	0 (0.0)	0 (0.0)	-
Other	0 (0.0)	0 (0.0)	0 (0.0)	-
What type of toothbrush do you use?				0.37
Hard-bristled toothbrush	6 (8.6)	4 (9.3)	2 (4.7)	
Medium-bristled toothbrush	40 (57.1)	25 (58.1)	21 (48.8)	
Soft-bristled toothbrush	24 (34.2)	14 (32.6)	20 (46.4)	
No toothbrush	0 (0.0)	0 (0.0)	0 (0.0)	
Do you use toothpaste to clean your teeth?				-
Yes	70 (98.6)	43 (100.0)	45 (100.0)	
No	1 (1.4)	0 (0.0)	0 (0.0)	

	Follow-up Subgroup			P-value
	Overall	Exit Interview n (%)	1-month Follow-up n (%)	
<b>Oral Health Practices</b>				
What type of toothpaste do you use?				0.43
No toothpaste	0 (0.0)	0 (0.0)	0 (0.0)	
Toothpaste without fluoride	7 (10.6)	4 (9.8)	2 (5.3)	
Toothpaste with fluoride	45 (68.2)	28 (68.3)	31 (81.6)	
Natural toothpaste	14 (21.2)	9 (22.0)	5 (13.2)	

Note: Categorical variables are presented as n (%). Totals may not equal 100% due to rounding. Missing values are excluded from the analyses.

**TABLE 4**  
Self-efficacy of participants immediately before and right after the community health worker intervention (N = 74)

<b>Likert Scale Item from the Exit Interview</b>	<b>Pre-intervention n (%)</b>	<b>Post-intervention n (%)</b>	<b>P-value</b>
How confident (sure) do you feel that you are able to take good care of your mouth, teeth and gums?			<0.001
Not at all	0 (0.0)	0 (0.0)	
Not very confident	8 (11.4)	1 (1.4)	
Somewhat confident	49 (70.0)	37 (53.6)	
Very confident	13 (18.6)	31 (44.9)	
How confident (sure) do you feel about asking your dentist or dental hygienist questions?			<0.001
Not at all	2 (2.9)	1 (1.4)	
Not very confident	16 (23.2)	1 (1.4)	
Somewhat confident	37 (53.6)	45 (64.3)	
Very confident	14 (20.3)	23 (32.9)	

*Note:* Categorical variables are presented as n (%). Percentages might not add to 100% due to rounding. Comparisons of categorical variables were made using Fisher's exact test, which is more robust to small cell sizes than the chi-square test.