Recruitment of Chinese American Elders into Dementia Research: The UCSF ADRC Experience

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Purpose: To describe the results of efforts to recruit Asian Americans into longitudinal research on cognitive decline in aging. **Design and Methods:** Recruitment strategies include clinics for assessment of cognitive impairment at the University of California, San Francisco campus and San Francisco's Chinatown, lectures to local health care providers and community members, participation in community events, and publications in mass media. **Results:** Over 200 Chinese patients were evaluated in our outreach clinic. Many were primarily Chinese speaking with low levels of education. One hundred and twenty-five participants enrolled, and annual follow-up has been 88%. Among enrollees, 36% were recruited from our clinical service; 30% via word of mouth; and the rest from community lectures and events, flyers, and mass media. Participants who enrolled were relatively highly educated, tended to be interested in learning about their cognitive abilities, and were supportive of the goals of research. **Implications:** Despite the significant cultural and linguistic barriers, Chinese Americans can be successfully recruited into longitudinal studies of aging and cognitive impairment. Clinical services are a critical component of such an effort, and low education and other factors that may be associated with it are clear barriers to research participation.

Key Words: Alzheimer's disease, Asian and Pacific Rim Older Adults, Attitudes and perceptions toward

aging/aged, Cognition, Cross-cultural studies, Dementia, Ethics (research, practice, policy, individual choices).

Asian Americans are one of the fastest growing population groups in the United States. Among Asian Americans, Chinese Americans are the largest group, representing 23% (<http://www.census.gov/acs/www/>). The life expectancy of Asian Americans living in the United States is in the mid 80s (<http://www.census.gov/population/www/projections/index.html>). Given that the incidence of dementia increases steadily with age (J. H. Chen, Lin, & Chen, 2009), we can expect an increasing need for geriatric dementia care in Chinese Americans. Although Asian Americans represent 4.37% of the total U.S. population, they are not well represented in clinical research, including studies of dementia (Hinton, Guo, Hillygus, & Levkoff, 2000; Hou, Yaffe, Perez-Stable, & Miller, 2006).

The University of California, San Francisco (UCSF) Alzheimer's Disease Research Center (ADRC) was established in 2004. As 1 of 30 ADRC's currently funded by the National Institute on Aging (<http://www.nia.nih.gov/Alzheimers/ResearchInformation/ResearchCenters/>), the mission of the UCSF ADRC is to promote earlier and more accurate diagnosis of neurodegenerative dementias

by enrolling older individuals with cognitive and behavioral changes into longitudinal clinical research. The annual research participation involves several hours of clinical assessment including a neurological exam, neuropsychological testing, and an interview with an informant at the university hospital. Participants are often asked to make a second visit for magnetic resonance imaging (MRI) scanning, and remuneration is low. Thus, there are many aspects of the research that might lessen the enthusiasm for participation. At the same time, a major goal of the UCSF ADRC and the ADRC program in general is to translate knowledge gleaned from research to underserved communities and promote participation of socio-economically or otherwise disadvantaged groups in research. In San Francisco County, Chinese Americans constitute one fifth of the total population, making this one of the largest Chinese American communities in the United States (<http://www.census.gov/acs/www/>). Because of the prominence of Chinese Americans in the San Francisco Bay Area and in order to begin addressing the underrepresentation of Chinese Americans in dementia research, UCSF has developed a Chinese Outreach Program to promote participation of Chinese Americans in dementia research.

The context in which our outreach program was undertaken was one where significant barriers prevent enrollment of Asian Americans into dementia research. It has been noted that members of the Asian American community may endorse beliefs that hamper research participation, including the belief that memory loss is normal for aging (and not a disease), that research participation can cause excessive worry and thus be harmful, and that Alzheimer's disease (AD) carries a social stigma. Additionally, medical practitioners serving the Asian community do not always see research as beneficial to participants ([Hinton et al., 2000](#)). These issues are compounded by the fact that the largest portion of the Chinese American community in the Bay Area lives in Chinatown and is geographically separated from the facilities at UCSF, and many individuals in Chinatown are uncomfortable coming to the UCSF campus for medical care. Studies have indicated that the location of health services and transportation are significant barriers for minorities in accessing health care and that increasing the convenience of health care service and partnering with community organizations can improve interactions with minority communities

([Flanagan & Hancock, 2010](#); [Perry, Chien, Walker, Fisher, & Johnson, 2010](#)).

In addition, research in dementia is beginning to focus on the earliest symptoms of memory impairment that occur before the development of frank dementia. Patients with such symptoms are often diagnosed with mild cognitive impairment (MCI), and they are at increased risk of developing dementia ([Petersen et al., 2001](#)). It is possible that disease-modifying treatment of degenerative diseases will only be effective at this early stage ([Roberson & Mucke, 2006](#)). Thus, our goals were to enroll a cohort of patients spanning a range of cognitive impairment from none (normal elderly controls) through MCI to frank dementia. However, enrollment of MCI patients into research depends on them or their family recognizing that they are showing cognitive impairment and being concerned enough to bring them in before the deficits are having significant impact. The potential cultural stigma associated with a diagnosis of dementia ([Hinton et al., 2000](#)) may inhibit patients from complaining to their physicians about cognitive changes or may inhibit families from bringing up these issues for fear of insulting an older family member or a perceived head of the household. In support of this concern, prior studies have suggested that East Asian immigrants are less likely to seek mental health services and recommend them to others ([Barry & Grilo, 2002](#)), and a recent study indicated that Asian Americans were less likely than Caucasians to be referred to mental health research through traditional mental health pathways ([Bistricky, Mackin, Chu, & Arean, 2010](#)). In contrast, more advanced dementia is often associated with disruptive behavioral problems ([J. C. Chen, Borson, & Scanlan, 2000](#)), which often result in presentation to a physician for help with management. Thus, we surmised that we might have difficulty identifying patients with MCI but rather would have most of our referrals already be in a stage of dementia.

In order to overcome some of the barriers to participation, we established outreach clinics in San Francisco's Chinatown where local practitioners could refer patients for subspecialty evaluation of cognitive impairment. The outreach clinics take place in two institutions in the heart of Chinatown where community members frequently go for care. In addition, our group tried to engage with the Chinatown community by offering lectures targeted at Chinese American elders and participating in an annual health fair. The purpose of this

article is to describe the efforts made to promote enrollment of Chinese Americans into research and learn more about the factors predicting enrollment into longitudinal studies of aging in this community by examining the demographics of the potential research participants encountered in these settings and exploring the characteristics of individuals who chose to enroll.

Design and Methods

The goals of the UCSF ADRC with respect to minority enrollment are to provide clinical service to the underserved community; to educate health care providers, patients, and community-dwelling laypersons about AD and other forms of dementia; and to offer opportunities for research participation to Chinese American elders. A specific goal of the ADRC is to establish a cohort of 100 Chinese Americans (50 patients with cognitive difficulties and 50 older controls) who would participate in longitudinal research, with the patient group including both patients with dementia and MCI. In order to achieve these goals, we took several steps.

Establishment of an Outreach Team

An outreach team, consisting of three bilingual and bicultural staff (one neurologist and two research assistants), was assembled. These individuals staffed all clinic and research visits for Chinese Americans who spoke primarily Chinese or were bilingual English/Chinese. They translated all brochures and consent forms into Chinese and administered cognitive testing in Chinese.

Outreach Clinics in San Francisco's Chinatown

Although the university-based cognitive assessment clinic at UCSF sees a somewhat diverse group of patients, this cohort is not entirely representative of the San Francisco community. A survey of the 1,792 new patients seen at the UCSF Memory and Aging Center (MAC) clinic over the last three years revealed that about 72% were Caucasian, 4% were African American, 11% were "other races," and 13% were Asian-Pacific Islanders, including 7% who were Chinese American. The mean age in this clinic is 70, and the mean level of education is 15 years. Because this proportion of Chinese Americans underrepresents the general proportion of Chinese Americans in San Francisco, we established outreach clinics specifically designed to evaluate Chinese Americans and improve opportunities to recruit

them into research. Two locations for evaluations of patients with cognitive impairment were established in San Francisco's Chinatown, in collaboration with the existing local health care providers. The clinics occur weekly at the Chinatown Public Health Center (CPHC), which is operated by San Francisco's health department (<http://www.sfdph.org>) and Chinese Hospital, a non-profit community-owned hospital (<http://www.chinesehospital-sf.org>). Over the years, our staff has established contacts with CPHC staff and private physicians and clinics with large numbers of Chinese American patients and made them aware of our services, and patients with cognitive complaints are referred for evaluation to the UCSF campus clinic or one of our outreach clinics.

The clinical evaluation at the outreach sites consists of a history and examination, including recording of past medical problems and current medication use, neuropsychological testing, and concurrent history from a knowledgeable informant to provide ancillary information about the patient's level of functioning. Patients whose primary language is Chinese (Cantonese or Mandarin) undergo cognitive testing using the Chinese version of the Cognitive Abilities Screening Instrument (CASI-C; Lin et al., 2002; Liu et al., 1994). All patients are strongly urged to bring an informant who can attest to the cognitive abilities of patient being evaluated. Diagnoses are established by consensus of two neurologists after review of all the clinical information.

All patients seen as part of our outreach efforts are asked to sign a UCSF Institutional Review Board (IRB)-approved consent to have their data used for research purposes. Individuals meeting criteria for participation in our ADRC are offered the opportunity to enroll using a separate consent form. Consent to participate in the ADRC involves a commitment to longitudinal follow-up for at least five years for clinical assessment including neurological exam, neuropsychological testing, interview with an informant, and also an MRI scan. Additional procedures include blood sample collection for genetic studies, including DNA and RNA banking, plasma banking, and establishment of immortalized cell lines at the National Cell Repository for AD (<http://ncrad.iu.edu>).

Other Community Outreach Efforts

The community clinics are supplemented by educational efforts to increase knowledge about

cognitive dysfunction and awareness of our services. These efforts are geared toward increasing the exposure of our program in Chinatown and also to foster enrollment of cognitively normal Chinese Americans. Lectures directed at health care providers as well as laypersons are given at local hospitals and clinics. Lectures directed at community-dwelling Chinese Americans are regularly given in Chinese (Mandarin, Cantonese, or both with translation, as appropriate). In 2008, a continuing medical education conference for dementia was conducted in San Francisco's Chinatown. The conference was divided into two tracks, one directed at health care providers and the other directed at community-dwelling elders, patients with cognitive impairment and family and caregivers. The community-oriented lectures were simultaneously translated into Chinese. Efforts are made to obtain coverage of the program in local Chinese newspapers, and on radio, and TV stations with large Chinese American audiences. Chinese language educational brochures and research recruitment flyers are distributed in the community.

One particular venue allowing significant exposure to Chinese Americans is the Chinatown Community Health Fair, a day-long event that occurs annually and offers education and screening for many health problems, such as diabetes, hypertension, and osteoporosis. Representatives from many health-related organizations participate in this event each year, and large numbers of Chinatown residents attend. UCSF has had a booth at these events for the last three years and provides free educational materials and cognitive screening using the Chinese version of the Mini-Mental State Examination (MMSE), along with brief feedback. In addition to MMSE scores, several pieces of information are collected from each participant, including age, education level, whether they are noticing memory problems, and whether they are willing to participate in research. After the fair, our staff members follow up with each individual willing to participate in research. This event allows interaction with a broad sample of Chinatown residents and serves as an opportunity to recruit patients with various levels of cognitive impairment into research as well as potentially normal controls with similar demographics to those of patients seen in our outreach clinics. In the last two years, we have collected demographics and clinical data on these individuals (with approval from the UCSF IRB), allowing us to have a snap-

shot of the demographics for people interested in cognitive health in Chinatown.

Recruitment Survey

In order to better understand the attitudes about research in the Chinese American community, and the factors that influence enrollment versus non-enrollment, we implemented a survey in the last year, which was administered to participants who did and did not enroll in our ADRC. This was administered to consecutive patients seen at our outreach center as well as participants enrolling in our ADRC at the time of their ADRC consent. The survey examined a few demographic factors, basic attitudes toward research, and potential barriers to research participation, such as costs and travel, as well as factors that might motivate people to participate. Eighty participants took the survey, and the mean age was 68.3 years and mean education level was 11.8 years.

Results

Chinatown Outreach Clinics

In the Chinatown outreach clinics, we evaluated 231 Chinese-speaking patients referred by a physician for cognitive concerns. The demographics in this group are shown in Table 1. The mean age was 74 years, education level was relatively low at around eight years, and the majority was monolingual Chinese speaking. Figure 1 shows the diagnostic breakdown for 126 patients in whom a clear etiology was identified for their cognitive impairment in our database. Thirty-eight percent

Table 1. Demographics of Chinatown Health Fair Participants and Outreach Clinic Patients (N = 453)

	Outreach clinics ^a (%)	Community health fairs ^b (%)
Age in years (SD)	74 (11.1) ^c	63.3 (11.7) ^c
Gender	36.4 ^d	26.2 ^d
Education in years (SD) ^e	7.7 (5.1)	9.5 (4.3)
Language		
Chinese only	96.7	92.1
Bilingual	7.1	4.7
English only	0.5	2.3

Notes. ^an = 231.

^bn = 222.

^cAverage age in years.

^dPercentage of male participants.

^eAverage education level in years.

Diagnosis of Chinatown Clinic Patients (N=126)

Figure 1. AD = Alzheimer's disease; DLB = dementia with Lewy bodies; MCI = mild cognitive impairment; PSP = progressive supranuclear palsy; Vas = vascular dementia.

had AD, whereas a significant number has vascular diseases of the brain along with AD. Thirty-eight percent had MCI. In small groups, vascular disease alone (6%) and also depression alone (9%) was considered the chief cause of cognitive complaints. About 8% had non-AD/non-vascular dementias, including dementia with Lewy bodies, frontotemporal dementia, and progressive supranuclear palsy. These findings indicate that our outreach clinic generated appropriate referrals for ADRC recruitment, including patients with dementia and MCI. Of all the patients seen at the outreach clinics, about 35% were considered eligible for research and were asked to consider enrolling. This usually involved taking home a consent form and being asked to permit a follow-up phone call.

The Chinatown Public Health Fair

The demographics from the health fair were similar to those at the outreach clinics. Out of 222 participants screened, the average age was 63.3 years, and the average education level was 9.5 years, with more than 30% having 6 years or less education and 85% having 12 years or less (Table 1). Seventy-six percent of the participants endorsed having memory problems and 32% had an MMSE of 26 or less. Sixty percent expressed an interest in participating in memory research (based on the query: "Would you be interested in participating in memory research?"). The mean level of education of those expressing an interest in being contacted was 9.1 years.

Research Enrollment

One hundred and twenty-five Chinese Americans have enrolled into our longitudinal ADRC study, allowing us to meet our goal of establishing a cohort of 100 Chinese Americans. Table 2 shows the demographics and diagnostic breakdown in the Chinese American enrollees, divided according to recruitment source. We were able to achieve our targeted mix of diagnoses, with 40% of our Chinese American enrollees being cognitively normal, 33% carrying a diagnosis of MCI, and the rest having dementia, mostly due to AD. Among those who were cognitively impaired, 27% were recruited from the Chinatown outreach clinics, 31% were recruited from our regular MAC clinic, and the rest were recruited from a variety of sources, including advertisements, news stories, word of mouth, and the Chinatown Community Health Fair. The enrollees from the Chinatown outreach clinic sites represent 31% of those who were asked to consider enrollment (about 11% of the 231 patients evaluated in the outreach clinic). Among the controls, the most common source was word of mouth from friends or relatives who had participated (52%). Nearly all enrollees donated blood samples, including 89% who consented to storage of their DNA. Eighty-eight percent of enrollees came in for their annual follow-up visit, with the majority of participants completing their second year.

The demographics of the Chinese American ADRC enrollees shown in Table 2 are interesting to compare with the demographics of those from the health fair and outreach clinics in general (from Table 1). The cognitively impaired ADRC participants were more educated and more likely to speak English than the general population seen in the outreach clinic and health fair, although the mean education level was still lower than the average of about 17 years in our Caucasian enrollees (data not shown, but collected from a sample of over 400 Caucasian ADRC enrollees). Among the groups recruited from different venues, the group with the lowest education level was from the Chinatown outreach clinics; however, their level of education of 11.2 years was still substantially higher than the average of 7.7 years for all patients evaluated in the outreach sites. When we separated out the Chinese American controls, they showed a very high level of education at 15.9 years compared with the 13.8 in the cognitively impaired Chinese American ADRC enrollees, although 46% of controls are still monolingual Chinese speakers.

Table 2. Demographics of Alzheimer's Disease Research Center Enrollees by Recruitment Source (N = 125)

	Outreach clinics ^a (%)	UCSF campus clinic ^b (%)	Community health fairs ^c (%)	Other sources ^{d,e} (%)
Age in years (SD)	75.4 (10.1) ^f	73.4 (8.9) ^f	69.3 (6.6) ^f	64 (10.7) ^f
Gender	40.9 ^g	56.5 ^g	72.7 ^g	36.2 ^g
Education in years (SD)	11.2 (5.9) ^h	13.3 (4.2) ^h	12.5 (4.4) ^h	16 (3.3) ^h
Diagnosis				
Dementia	13 (59.1%)	11 (70%)	—	5 (7.2%)
MCI	7 (31.8%)	7 (30.4%)	5 (45.5%)	22 (31.9%)
Normal	2 (9.1%)	—	6 (54.6%)	42 (60.9%)
Language				
Chinese only	77.3	65.2	72.7	44.9
Bilingual	18.2	8.7	27.3	40.6
English only	4.5	26.1	—	14.5

Notes. MCI = mild cognitive impairment; UCSF = University of California, San Francisco.

^an = 22.

^bn = 23.

^cn = 11.

^dn = 69.

^eOther sources: referral from other participants (n = 22), Internet Web site (n = 12), flyers (n = 8), staff acquaintances (n = 7), other clinics (n = 4), newspapers (n = 2), community lectures (n = 2), and other sources (n = 12).

^fAverage age in years.

^gPercentage of male participants.

^hAverage education level in years.

As noted above, about 60% of participants contacted at the Chinatown Community Health Fair indicated a potential willingness to participate in research. We called each of the participants who indicated an interest in research at the 2008 health fair (n = 65), making at least three attempts to contact each one. Forty-three percent of these potential participants could not be contacted because they did not answer the phone and did not have an answering machine. A small number of participants did not have a working phone number. The average level of education was lower (9.4 years) in those who could not be contacted than in those who were contacted but chose not to enroll (10.1 years). Ultimately, 11 enrolled in our longitudinal research. The demographics in this small group are notable, in that the mean education level was 12.5 years and 27% were proficient in English (bilingual; Table 2). These numbers are again higher than the numbers recorded at the Chinatown Community Health Fair overall. Six of these people were cognitively normal and five had MCI. None had dementia.

Recruitment Survey: Barriers and Attitudes About Research

Thus far, this survey has been administered to 52 enrollees and 28 patients evaluated in the outreach clinic who ultimately did not enroll. As

shown in Table 3, the ADRC research participants and nonparticipants share similar demographics (age and language) except education level (10 vs. 13 years). Other than this, the most notable difference is that ADRC participants value research and feedback from physicians more than non-enrollees. Research participants also seem to worry less about other health conditions. Monetary compensation was not a major factor, although transportation compensation and free lunch were mild inducements.

Discussion

Over the last few years, our group has made substantial efforts to enroll older Chinese Americans into longitudinal research. Through these efforts we have learned several lessons. First, it is clear that Chinese American elders, like other individuals in their age group, have concerns about their memory, which were endorsed in 76% of individuals seen in the Chinatown community health fairs. Although these data come from a group who volunteered for memory screening, the resulting number of people who would be targets for memory evaluation is quite substantial. In addition, despite the potential cultural factors discussed in the introduction that might decrease the likelihood of patients presenting for evaluation in the early phases of illness, we were able to enroll a

Table 3. Results of Survey Regarding Attitudes Toward Research Participation (N = 80)

	Non-enrolled clinic patients ^a	ADRC research participants ^b	Statistic ^c	p Value
Demographics				
Age in years (SD)	73.7 (10.6) ^d	68.4 (11.9) ^d	2.13	.036
Education in years (SD)	10.5 (5.8) ^e	12.6 (5.4) ^e	1.59	.116
Chinese speaking only (%)	39	37	0.17	.683
Responses				
Category and item	Percent responding "yes"	Percent responding "yes"		
Endorsement of research				
They believe research is very important	57	89	10.24	.001
Good reasons to enroll in research				
They believe research will benefit others	18	77	25.8	<.001
They care about the purpose of research	14	40	5.77	.016
They have a family history of dementia	11	8	0.21	.658
Barriers in participating research				
Physical/health reasons	21	12	1.4	.237
No spare time	18	29	1.17	.279
Lack of transportation	7	10	1.39	.709
Lack of family support	7	8	0.08	.929
No benefit for themselves	0	2	0.55	.46
Things that would motivate them to participate in research				
Getting more attention from physicians and better monitoring of cognition	36	63	5.64	.018
Monetary compensation	14	17	0.02	.896
Transportation compensation	4	19	3.76	.052
Free lunch	0	6	1.68	.195

Notes. ADRC = Alzheimer's Disease Research Center.

^an = 28.

^bn = 52.

^ct Tests for means; chi square for proportions.

^dAverage age in years.

^eAverage education level in years.

substantial number of patients with mild cognitive complaints that might represent the early symptomatic stages of neurodegenerative disease.

Second, the elderly Chinese Americans in Chinatown are faced with many of the barriers usually associated with first generation immigrant populations, including low levels of education and lack of proficiency with English. Nevertheless, patients in this group can be successfully enrolled and maintained in longitudinal dementia research. Our high rate of follow-up (88%) indicates that the commitment on the part of our research participants is genuine. Clinical services conducted within the enclave of Chinatown are a critical component of these efforts because they offer patients and families feedback about their cognitive abilities and a context for introducing the researchers and the goals of research in a convenient location. Successful recruitment, however, requires a major effort and is not very efficient. In our case, we devoted three staff almost completely to this effort, and ultimately enrolled only about 11% of the patients

seen in the outreach clinics and 8% of those recruited from community health fairs in 2008. The fact that we were successful in recruiting participants into research is consistent with a prior study indicating that minorities are not necessarily less willing than Caucasians to participate in research (Wendler et al., 2006). The authors of that paper concluded that minorities are underrepresented in research because of lack of access to research studies, rather than lack of willingness. We recognize that barriers to minority recruitment into research are very complex. For many reasons, including long histories of documented abuse of minorities for research purposes, potential research participants who are minorities harbor understandable suspicion of researchers, and barriers of this type cannot be overcome merely by providing better access (Corbie-Smith, Thomas, Williams, & Moody-Ayers, 1999; Doescher, Saver, Franks, & Fiscella, 2000; Stark et al., 2002). Even in studies where this type of mistrust has been identified, there have been signs indicating that direct and

easy access to researchers, combined with thorough and open communication about procedures and goals, may help to overcome these barriers (Corbie-Smith et al., 1999). The outreach efforts made for our ADRC are an example of ways to improve access to research for minorities by providing community services.

Although we achieved our goals for recruitment, many participants contacted did not elect to participate in our research projects. Several factors appeared to increase willingness to participate. These included the desire to better understand one's own health condition and a generally positive attitude toward research. This is potentially consistent with prior studies' result which indicated that having a disease or a friend or relative with a disease that is relevant to the research, along with generally positive attitudes toward the research and the motivations of researchers helps with participation (Trauth, Musa, Siminoff, Jewell, & Ricci, 2000). Having a particular disease may influence the desire to participate in research in several ways. It may raise awareness of the disease and lead to an increased desire to help others. In our patients, our impression was that their concerns that they themselves had a significant memory problem that they wanted to understand better were an important motivator for them to participate in research (i.e., they thought research might be beneficial to them). We did not design our survey to carefully differentiate the degree to which altruistic motivations versus hope for personal gain were influencing an individual's decision, but this might be a useful area for more investigation in the future. Furthermore, among those participants who were not recruited from clinics, 42% were recruited via personal referrals from other participants or staff (Table 2, bottom), further reinforcing the idea highlighted in the a prior study that trust in the researchers is a helpful factor for motivating participation (Trauth et al., 2000).

Education also appeared to be a characteristic that differentiated those who enrolled in research from those who did not; even among patients seen initially in Chinatown, those who enrolled in research tended to have a higher level of education. This was particularly true in the control group. Language ability seemed to be less of a barrier because there were many monolingual Chinese patients, even among the controls (47%). The way in which education influences likelihood of enrollment is difficult to specify, but one possibility is that education is an important predictor of atti-

tudes toward research, as has been suggested in prior studies showing that having a college degree is associated with a more open-minded attitude about research participation (Trauth et al., 2000). In particular, the cultural attitudes toward cognitive impairment discussed in the introduction (Hinton et al., 2000) could conceivably be influenced by education.

On the other hand, our demographic data from Chinatown Health Fair participants indicated that many individuals (60%) with a low-education level did express an interest in research, suggesting that Chinese Americans with low-educational levels may not always harbor negative attitudes toward participating in research on cognition. Education may be a surrogate for other unmeasured factors more closely associated with willingness or ability to participate, such as income, living situation, family support, and the availability of free time. Some of these factors might hamper one's ability to participate despite being motivated. One example from our efforts was our finding that over 50% of those from the community health fair who expressed an interest in research either had a non-working phone number or no answering machine. The level of education was in fact slightly lower in this group than in those who could be contacted but still chose not to enroll. In this case, education may be directly related to this problem (e.g., not being confident with using an answering machine) or there may be other cultural or economic factors that make these individuals less likely to have working phones and answering machines. Overall, these findings suggest that more directed studies should be done to adequately address the potential relationship between education and research participation in Chinese Americans.

Although our experience makes it clear that Chinese Americans can be recruited into research on aging and dementia, it also underscores the importance of overcoming the barriers to participation associated with low education and the other factors that may be related to it. Poor representation of these individuals in research could have implications for the generalizability of the findings because education also has significant implications for cognitive testing (Lezak, 1995), health status (H. J. Kim & Prah Ruger, 2010; J. Kim & Durden, 2007; Nuru-Jeter, Sarsour, Jutte, & Thomas Boyce, 2010), and compliance with treatment (Madan et al., 2010), and these may in turn influence the validity of diagnostic testing or the

efficacy of therapeutic interventions. Thus, continued efforts should focus on improving recruitment of these less educated individuals.

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