

A Systematic Review of Recruitment for Older Chinese Immigrants into Clinical Trials

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Abstract

The purpose of this systematic review was to identify barriers and discuss strategies for recruitment of older Chinese immigrants into clinical research studies. A review was conducted using Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA). PubMed, WEB of Science, CINAHL Plus, and the Cochrane Central Register of Controlled Trials were searched for articles published between 2001 and 2014. Empirical studies with Chinese immigrants aged 60 years or older were identified and analyzed. Numerical analysis, such as calculation of response rates as indexes for recruitment outcomes, was conducted. Content analyses for recruitment barriers were abstracted. Thirteen studies of 4,753 subjects were analyzed. Response rates ranged from 39% to 99%. Recruitment barriers included age (i.e., 60-70 years old), low health literacy, longer length of stay (LOS) in the United States, limited English speaking ability, low acculturation, time constraints, inadequate transportation, social stigma about diseases, and mistrust of researchers. Recruitment can be facilitated by overcoming the aforementioned barriers, which included the following strategies: 1) using convenience sampling methods, particularly personal referral; 2) using special techniques to recruit a younger subgroup of Chinese elders, such as doing outreach on holidays or weekends; 3) communicating effectively using participants' native language; 4) exercising cultural competency; 5) establishing relationships of trust with participants and community leaders; 6) answering misconceptions about clinical trials; 7) providing incentives for participation; and 8) proper selection of research and interview locations.

Keywords: recruitment, health disparities, Chinese, culturally sensitive care, elderly, health promotion

Recruiting older people to participate in clinical research studies has been challenging both in the United States (Sood & Stahl, 2011) and the United Kingdom (McMurdo et al., 2011). More than two decades after the National Institutes of Health Revitalization Act of 1993, with a purpose to promote research in minority Americans, reports of population-based clinical research on ethnic minorities such as Asian Americans are still limited (Chen, Lara, Dang, Paterniti, & Kelly, 2014).

The lack of Asians in major clinical trials can significantly impact regional population health. Asian Americans are one of the fastest growing ethnic groups in the United States and numbered 17.3 million in 2010 (Hoeffel, Rastogi, Kim, & Shahid, 2012). Chinese immigrants are the largest Asian subgroup and accounted for 4 million people in 2010 (Hoeffel et al., 2012). Asians make up more than 50% of the population in Hawaii and California (Hoeffel et al., 2012). There are roughly 370,000 Chinese immigrants aged 60 years and over residing in the United States (Ortman, Velkoff, & Hogan, 2014). However, clinical

trials that include older Chinese immigrants are disproportionately low. Researchers (Godden, Ambler, & Pollock, 2010) have noted a 30% lower chance for Chinese patients to be recruited when compared to Caucasians. Despite older Chinese immigrants enjoying a healthy immigrant effect (Corlin, Woodin, Thanikachalam, Lowe, & Brugge, 2014), Chinese immigrants living in Northern California were found to have a higher proportionate mortality burden of cardiovascular and cerebrovascular disease than non-Hispanic Whites (Jose et al., 2014).

Underrepresentation in clinical research (Chao et al., 2011) and limited access to health care partially explain the high mortality from chronic diseases, such

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as hypertension, in the Chinese community (Cooper, Hill, & Powe, 2002). Due to language and cultural barriers, older Chinese immigrants are seen as a challenging population for studies of morbidity and mortality of chronic disease (Li, Wallhagen, & Froelicher, 2008; Taylor-Piliae & Froelicher, 2007). The association of health care disparities with poorer clinical outcomes among ethnic minorities (Nelson, 2002) prompts the need to provide culturally competent and appropriate care. One way to do so is by soliciting greater representation of these groups in health-related research studies. One review of more than 2,500 articles, included 48 articles in their final review, on recruitment strategies for minority populations, showed a lack of information on how to recruit and retain Chinese immigrants for research (UyBico, Pavel, & Gross, 2007). Furthermore, only 23% of the published studies investigated older patients (UyBico et al., 2007).

The purpose of this study was to fill gaps in current research on how to recruit Chinese American immigrants who are 60 years or older into clinical trials. The aims were to review published reports of studies that recruited older Chinese immigrants to explore the recruitment barriers and to discuss strategies to overcome these barriers. The target population for this review was first generation Chinese immigrants. Second generation and beyond is not the target population in this study as they represent a different subgroup who are fluent in speaking English and have different cultural and health practice backgrounds. In this paper, Chinese immigrants and Chinese American immigrants will be used interchangeably.

It is noteworthy to mention that since strategies for recruitment and retention are different, the focus of this study addresses only barriers and strategies for recruitment. Retention is another important extensive topic that should be addressed in future research. However, the review findings included reports of retention rates to further demonstrate that retention and recruitment are not the same concepts – will be discussed later in this paper.

Methods

The PRISMA was used as a guideline for this review (Moher, Liberati, Tetzlaff, & Altman, 2009). The PRISMA is a revision and exposition of Quality of Reporting of Meta-analyses Statement that has been continuously developed by a group of renowned international scholars (Moher et al., 2015; Shamseer et al., 2015). Recently, it has been endorsed by more than 146 leading medical journals (Tao et al., 2011) and

highly regarded as a standard in the report of systematic reviews and meta-analyses. Studies have shown that using the PRISMA guideline has improved the quality of a review article (Panic, Leoncini, de Belvis, Ricciardi, & Boccia, 2013). Using the PRISMA guideline, two investigators independently conducted a systematic search for articles. When there was a disagreement between the two reviewers, a third reviewer was consulted for the final selection.

Search, Identification, and Screening

PubMed, Web of Science, CINAHL Plus, and the Cochrane Central Register of Controlled Trials were searched for articles, with a time frame of January 2001 through December 2014. Search keywords were: recruit, recruitment, Chinese Americans, Chinese immigrants, first generation Chinese Americans, elderly, and older adult. Keywords were used independently or in combination with search titles, abstracts, and text. Records with the following criteria were included: Chinese Americans or Chinese immigrant focused studies, subjects self-identified as Chinese Americans or Chinese immigrants or first generation of Chinese American, subject aged 60 years or older, quantitative study design, recruitment information available, and published in English.

PubMed was first searched using the standardized search strategy as described. The search was continued using keywords on the topic in Web of Science and Cochrane. In CINAHL Plus, a Boolean phrase search was used to search the abstract, title, and text. Endnote version 7 (Thomson Reuters, Philadelphia, PA, USA) was used to import and manage identified records from the selected databases.

After screening for inclusion and exclusion, 13 studies met the criteria of having subjects aged 60 years and older, had a sample size greater than 25, and a quantitative study design (Figure 1). Literature reviews, commentaries, and editorials were excluded. All selected studies were published in peer-reviewed journals.

Studies that recruited multi-ethnic minorities were chosen if they enrolled more than 25 Chinese Americans aged 60 years and older. Based on a quasi-experimental study with one group pre and post intervention, a sample size of 25 provides more than 80% power to detect a difference, assuming $p = 0.05$ (two-sided) and a small effect size ($d = .15$). Thus, we used 25 as our cutoff point. Most of our studies, except one ($n = 39$), had a sample size of more than 40. Therefore, we believe the studies included could provide reliable data for analysis and interpretation.

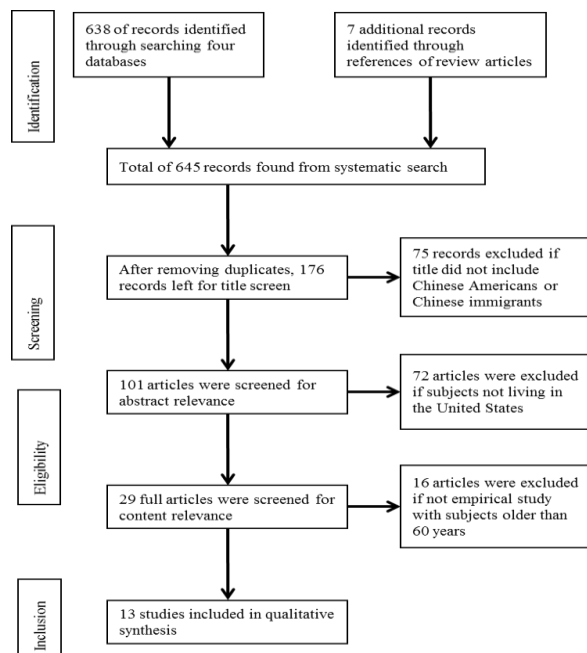


Figure 1. Flow of the systematic review.

Risk of Bias and Data Extraction

Methodological quality was assessed by the completeness of reports on subject demographic data, study response rates, and recruitment methods. To manage missing information, original research reports published by the same group of authors under the same research project title were retrieved for thorough evaluation. Data on research design and subject selection were first extracted from the original reports. Subject characteristics that may be considered recruitment factors including age, level of education, and length of stay (LOS) in the United States were extracted from the original reports and supplemented by original reports published by other authors of the same study. Recruitment methods, including personal referral, media advertisement, and community outreach were also extracted and supplemented by original reports published by other authors of the same study. Outcomes reported response rates, retention rates, and proportion of various recruitment methods.

Data Analysis

Two types of data analyses were used: numerical and content analyses. For the former, descriptive analysis for participant characteristics and calculation of contributory proportion of each type of recruitment method and proportions of recruitment and retention were conducted (see Table 1). For the latter, two reviewers conducted multiple readings independently to identify

prominent variables (themes). Accordingly, two versions of variables were compared and discussed between two reviewers. The third reviewer was consulted to select final variables and to develop a coding template that contained all variables. The coding template was used to document frequency of variables that appeared.

Variables for the Systematic Review

Numerical Analysis

Data were extracted based on the following variables: participant characteristics, recruitment methods employed (i.e., contributory proportion of recruitment), response rates, and retention rates. Participant characteristics included age, level of education, native language, and LOS in the United States. Descriptive statistics in the forms of means and proportions were used to characterize demographic variables. Response rate was a ratio calculated by dividing the number of subjects enrolled by the number of subjects screened. Retention was a ratio calculated by dividing the number of subjects who withdrew from the study by the number of subjects enrolled. Contributory proportion of recruitment was a ratio calculated by dividing the number of enrollment using a specific recruitment method by the total number of subjects enrolled. All of the chosen studies were conducted in metropolitan areas that were known to have concentrated Chinese American communities as documented in the U.S. Census (2010). These areas included New York, San Francisco, Boston, Chicago, and Hawaii (Hoeffel et al., 2012).

Content Analysis

As aforementioned, variables for content analysis were selected among three reviewers: 1) limited English speaking capability, 2) low acculturation, 3) inadequate transportation, 4) time constraints, 5) social stigma about disease, and 6) negative attitude toward researchers.

Results

Table 1 summarizes the 13 studies that met inclusion criteria in chronological order. There were four randomized controlled trials, four quasi-experimental studies, three cross-sectional studies, one prospective longitudinal cohort study, and one population-based epidemiological study. Response rates, contributory proportions of recruitment methods, and retention rates were used to illustrate recruitment efforts and outcomes. Nine studies reported response rates and five studies reported contributory proportions of recruitment methods; 11 studies reported retention rates.

Table 1. Recruitment Efforts and Outcomes of Empirical Studies

First Author (year)	Study Purpose	Study Design & Sample Size	Subject Characteristics (Mean Age/Education/ Language/Length of Stay)	Sampling Method & Proportion of Recruitment Methods	Response Rate Retention Rate
Brugge (2005)	<ul style="list-style-type: none"> Investigate causes of resistance of research participation among older Asian immigrants. 	<ul style="list-style-type: none"> Cross-sectional study N = 76 	<ul style="list-style-type: none"> 70.6 years old (y.o.) 58% high school (HS)/college 96% Chinese 13.8 years 	Convenience sample <ul style="list-style-type: none"> Community health fairs 	<ul style="list-style-type: none"> Not reported (NR) NR
Wang (2005)	<ul style="list-style-type: none"> Assess a culturally tailored diabetes management program for Chinese Americans. 	<ul style="list-style-type: none"> Single group quasi-experimental study N = 40 	<ul style="list-style-type: none"> 68.8 y.o. 57.6% HS graduate 100% Chinese 16.5 years 	Convenience sample <ul style="list-style-type: none"> Personal referral (private physician, friends and relatives) Media Social clubs, religious organization 	<ul style="list-style-type: none"> NR 82.5%
Gallagher-Thompson (2006)	<ul style="list-style-type: none"> Compare the effectiveness of 3 recruitment modalities for enrolling Chinese American caregivers of dementia patients. 	<ul style="list-style-type: none"> Randomized Controlled Trial (RCT) N = 45 	<ul style="list-style-type: none"> 59.3 y.o. Average 13.4 years 80% Chinese 31.1 years 	Convenience sample <ul style="list-style-type: none"> 17.8% bilingual media advertisement 68.9% professional referral 13.3 nonprofessional referral 	<ul style="list-style-type: none"> 38.8% 82%
Li (2008)	<ul style="list-style-type: none"> Explore relationship between cultural factors and antihypertensive medication adherence in older Chinese immigrants. 	<ul style="list-style-type: none"> Cross-sectional study N = 144 	<ul style="list-style-type: none"> 75 y.o. 56.5% less than HS 98.5% Chinese 12.7 years 	Convenience sample <ul style="list-style-type: none"> 100% personal referral 	<ul style="list-style-type: none"> 80% NR
Taylor-Piliae (2007)	<ul style="list-style-type: none"> Develop and implement recruitment and retention strategies in Chinese immigrants for a Tai Chi exercise study. 	<ul style="list-style-type: none"> Single group quasi-experimental study N = 39 	<ul style="list-style-type: none"> 66 y.o. 87.2% less than 12 years 100% Chinese NR 	Convenience sample <ul style="list-style-type: none"> 60% media 40% referral 	<ul style="list-style-type: none"> 75% 97%
Wong (2008)	<ul style="list-style-type: none"> Test the efficacy of a culturally tailored smoking cessation program in the Chinese American community. 	<ul style="list-style-type: none"> RCT N = 464 	<ul style="list-style-type: none"> 58.3 y.o. 61% less than HS 94% Chinese 58.6% stayed in the United States 16 or more years 	Convenience sample <ul style="list-style-type: none"> 62.5% referral 21% media 15% letter & phone calls 	<ul style="list-style-type: none"> 76.9% 81.5%
Chiang (2009)	<ul style="list-style-type: none"> Test efficacy of a walking program in reducing hypertension in Older Chinese immigrants. 	<ul style="list-style-type: none"> Two groups quasi-experimental study N = 137 	<ul style="list-style-type: none"> 73.4 y.o. 50.8% less than HS NR 18 years 	Convenience, snowball sampling <ul style="list-style-type: none"> Personal referral (friends and relatives) 	<ul style="list-style-type: none"> NR 93.5%

Qi (2011)	<ul style="list-style-type: none"> Evaluate the effectiveness of an educational intervention based on the self-efficacy theory in preventing osteoporosis among Chinese immigrants. 	<ul style="list-style-type: none"> RCT $N = 110$ 	<ul style="list-style-type: none"> 64 y.o. 45.8% less than HS 80.8% Chinese 13 years 	<ul style="list-style-type: none"> Convenience sample <ul style="list-style-type: none"> Media Referral (clinic) 	<ul style="list-style-type: none"> 99% 75.5%
Chao (2011)	<ul style="list-style-type: none"> Investigate strategies of recruiting Chinese American elders with dementia into a longitudinal study. 	<ul style="list-style-type: none"> Longitudinal cohort study $N = 125$ 	<ul style="list-style-type: none"> 68 y.o. Average 12.6 years 37% Chinese NR 	<ul style="list-style-type: none"> Convenience <ul style="list-style-type: none"> 36% clinic 30% referral 34% media 	<ul style="list-style-type: none"> 62.5% 88.8%
Zhu (2012)/	<ul style="list-style-type: none"> Test the effects of telephone counseling for smoking cessation in Asian smokers. 	<ul style="list-style-type: none"> RCT $N = 51$ 	<ul style="list-style-type: none"> 64 y.o. and older 50.5% less than 12 years NR NR 	<ul style="list-style-type: none"> Convenience sample <ul style="list-style-type: none"> Media 	<ul style="list-style-type: none"> 75% 85.6%
Chesla (2013)	<ul style="list-style-type: none"> Test efficacy of culturally appropriated coping skills training for Chinese immigrants with diabetes. 	<ul style="list-style-type: none"> Single-group quasi-experimental study $N = 178$ 	<ul style="list-style-type: none"> 64.5 y.o. 12.2 years 100% Chinese 18 years 	<ul style="list-style-type: none"> Convenience <ul style="list-style-type: none"> Media University community clinics Health fairs Referral (providers) 	<ul style="list-style-type: none"> NR 81.5%
Simon (2014)	<ul style="list-style-type: none"> Assess demographic characteristics of Chinese American seniors in the Greater Chicago area. 	<ul style="list-style-type: none"> Epidemiological study $N = 3,159$ 	<ul style="list-style-type: none"> 72.8 y.o. 8.7 years 100% Chinese NR 	<ul style="list-style-type: none"> Convenience sample <ul style="list-style-type: none"> Personal referral (providers, family members, neighbors and friends) Media 	<ul style="list-style-type: none"> 91.9% 78.4%
Corlin (2014)	<ul style="list-style-type: none"> Compare health status between Chinese immigrants and U.S. born whites participating in the Community Assessment of Freeway Exposure and Health Study. 	<ul style="list-style-type: none"> Cross-sectional study $N = 188$ 	<ul style="list-style-type: none"> 65.3 y.o. 57% less than HS NR 18.4 years 	<ul style="list-style-type: none"> 58% random sampling <ul style="list-style-type: none"> Random selection from a phone book 42% convenience sample <ul style="list-style-type: none"> Governmental support Public announcement and community paper Trained recruiters 	<ul style="list-style-type: none"> 52.4% 78.2%

Random Versus Convenience Sampling

Twelve out of the 13 studies used convenience sampling, such as personal referral, media advertisement, community outreach, health fairs, and flyers (Table 1). Only one study used random sampling methods, such as random selection from a phone book (Corlin et al., 2014). Response rates in studies using a convenience sample ranged from 63% (Chao et al., 2011) to 99% (Li et al., 2008). The response rate in studies using random sampling was 52% (Corlin et al., 2014). This suggests that convenience sampling is a preferred way for recruitment and can generate a high response rate. Additional research is needed to confirm this.

In terms of convenience sampling methods, five studies reported contributory proportions of recruitment methods (see Table 1). Recruitment methods could be categorized into three types: personal/professional referral, Chinese media/bilingual media, or community outreach/health fairs. Personal referrals were made by friends, relatives, and family members. Professional referrals were made by the primary care team, primary care clinic, other medical professionals, or senior centers. Chinese media/bilingual media included Chinese newspapers, television, radio, bilingual flyers, and posters. Community outreach/health fairs included social clubs, religious organizations, community-based workshops, and trained recruiters. Personal referral or professional referral was reported to have the highest contributory proportion of recruitment method in four of five studies (See Table 1).

Recruitment Barriers

Numerical Analysis

Traditionally, subject characteristics including younger Chinese elderly (i.e., 60-70 years old), low health literacy, and longer LOS in the United States have been considered barriers to recruitment (Brugge, Kole, Lu, & Must, 2005; Chao et al., 2011; Li et al., 2008; Wang & Chan, 2005). In nine studies that reported both mean age and a response rate, older age was associated with a higher response rate. The response rates for six studies with a mean age of less than 70 years were below 80% (Chao et al., 2011; Corlin et al., 2014; Gallagher-Thompson et al., 2006; Taylor-Piliae & Froelicher, 2007; Wong et al., 2008; Zhu et al., 2012). In contrast, response rates in the two studies with a mean age above 70, were above 80% (Li et al., 2008; Simon, Chang, Rajan, Welch, & Dong, 2014).

A low educational level did not appear associated with response rate (see Table 1). For example, in the PINE study that had a high response rate, 92% of the participants had an average educational level of 8.7 years (Simon et al., 2014), while the study with the

lowest response rate had an average education level of 13 years (Gallagher-Thompson et al., 2006). It is noteworthy that low health literacy instead of low educational level hinders the comprehension of word-intensive educational materials or benefits of participating in the study (e.g., to help advance minority health in the community; Li et al., 2008; Wang & Chan, 2005). This indicates that, regardless of educational level, researchers should focus on improving participants' health literacy as a benefit of participating, which can in turn increase recruitment rate.

A longer LOS in the United States was associated with lower response rates. Eight studies reported a LOS that ranged from 13 years to 31 years. Five studies reported both a LOS and a response rate (Table 1). Among them, the study with longest the LOS had a lower response rate (Gallagher-Thompson et al., 2006). Studies with a shorter LOS (13 years) were recorded in two studies with a response rate higher than 80% (Li et al., 2008; Qi, Resnick, Smeltzer, & Bausell, 2011). Within these five studies, the LOS in the United States presented a reverse relationship with response rates.

Higher response rates were not associated with higher retention rates in 11 studies (Table 1). Of these, three studies reported a retention rate below 80% (Corlin et al., 2014; Qi et al., 2011; Simon et al., 2014) and two studies reported a retention rate above 90% (Taylor-Piliae & Froelicher, 2007; Wong et al., 2008). The study with the highest response rate (99%) had a low retention rate (75%; Qi et al., 2011). The studies with the second highest response rate, 91%, also had a low retention rate, 78% (Simon et al., 2014). A study with a moderate response rate of 75% had the highest retention rate (97%; Taylor-Piliae & Froelicher, 2007). Thus, there was no clear association between response rates and retention rates. This suggests that investigators should prepare different strategies for recruiting and retaining older Chinese immigrants.

In summary, barriers for participation included younger Chinese elderly (i.e., 60-70 years old), low health literacy, and longer LOS in the United States. Recognition of these barriers is critical in identifying strategies to ensure successful recruitment of older Chinese immigrants and to shorten the recruitment period. In addition, it was noted that different strategies should be applied for recruitment and retention of Chinese elders. As mentioned, since retention of older Chinese immigrants for clinical trials is a separate, important topic to address for research, the focus of this paper was to examine barriers for recruitment and strategies to improve recruitment. Discussion of retention is beyond the scope of this paper; thus, it is not discussed further. Future studies should discuss barriers

and strategies for retaining older Chinese immigrants for clinical trials.

Content Analysis

A content analysis was also conducted to discover more barriers, which can be categorized into two levels: customer-centered (Gallagher-Thompson et al., 2006) and community-centered (Taylor-Piliae & Froelicher, 2007). Six studies reported that limited English speaking ability was considered a customer-centered barrier and was associated with poor recruitment (Chao et al., 2011; Chesla et al., 2013; Gallagher-Thompson et al., 2006; Li et al., 2008; Wang & Chan, 2005). Five studies reported that inadequate acculturation was also a factor contributing to poor recruitment (Brugge et al., 2005; Gallagher-Thompson et al., 2006; Li et al., 2008; Wang & Chan, 2005; Wong et al., 2008). Low acculturation is defined as maladaptation of the cultural traits of another group and has been reported as a barrier for recruitment (Li et al., 2008; Wang & Chan, 2005). Other reported barriers were time constraints as participants may have family responsibilities, such as taking care of their grandchildren (Wang & Chan, 2005; Wong et al., 2008), and inadequate transportation service which makes it difficult to go to a research site (Chao et al., 2011; Gallagher-Thompson et al., 2006). There were two community-centered barriers. Three studies reported that social stigma about disease prevented patients from participating in a study. For example, a heart disease was considered to be associated with bad luck so patients and their family members did not want to discuss it, which resulted in strong objection to the study (Brugge et al., 2005; Chao et al., 2011; Gallagher-Thompson et al., 2006). Second, there were negative attitudes toward the researchers as potential participants did not understand the benefits to the community and thought the researchers only wanted what they could learn from the study (Chesla et al., 2013; Wong et al., 2008).

Discussion

From this review, recruitment barriers included younger Chinese elderly (i.e., 60-70 years old), low health literacy, longer LOS in the United States, limited English speaking ability, low acculturation, time constraints, inadequate transportation, social stigma about disease, and mistrust of researchers. Recruitment barriers and strategies to increase recruitment are focused in this discussion.

To increase recruitment rates for older Chinese immigrants into clinical trials, a variety of strategies are discussed. These strategies include 1) using convenience recruitment methods, particularly personal referral; 2) using special techniques to recruit younger Chinese elders; 3) communicating effectively using participants'

native language; 4) exercising cultural competency; 5) establishing relationships of trust with participants and community leaders; 6) answering misconceptions about clinical trials; 7) providing incentives for participation; and 8) proper selection of research and interview locations.

Convenience Sampling Methods

Convenience sampling is a good strategy to increase participation, reduce recruitment costs, and increase minority representation. Lee and Cheng (2006) compared convenience sampling including personal referral and flyers posted at the research site to random sampling in recruiting Chinese immigrants (mean age: 46.8 years old; Lee & Cheng, 2006). They recruited 325 participants using random sampling from a phone book and 138 using convenience strategies. For random sampling, providing monetary incentives increased the response rate by 10%; however, the process was laborious and had a lower success rate than convenience sampling. Postal addresses of Chinese candidates were selected from the yellow pages, but 20% were undeliverable because of outdated information. In addition, Lee and Cheng found that the high mobility of Americans along with surname confusion with other ethnic minorities were major disadvantages in random sampling recruitment. In contrast, because convenience sampling does not require random mailings, it may be considered a more focused and cost-effective approach. By selecting sites frequented by the target population, convenience sampling can yield numbers comparable to incentivized, random questionnaire mailings. Although they had younger participants, Lee and Cheng's findings are similar to some of the selected studies that consisted of study participants older than 60 years and found that convenience sampling is feasible and cost-effective for older Chinese Americans. In sum, Lee and Cheng's findings were consistent with our review findings suggesting that convenience sampling is feasible to recruit Chinese immigrants into clinical trials.

Among various convenience sampling techniques, personal referral, also called snowball sampling or chain sampling (Polit & Beck, 2013), is considered the most effective approach for recruiting African and Hispanic Americans (UyBico et al., 2007). Similarly, for Chinese elders, based on the reviewed studies, personal referral had the highest proportion of recruitment (Table 1). This may be due to the fact that Chinese elders connect through friends, care providers, and community leaders to establish trust with strangers, particularly Western care providers or researchers (Li, Stewart, Stotts, & Froelicher, 2006; Li et al., 2008). The advantage of convenience sampling appears to be a small, focused approach utilizing the snowball effect of word-

of-mouth referrals to build momentum and trust amongst the target community. Random sampling is less personal and involves canvassing a large group of potential candidates but requires a substantial commitment of time, money, and resources. Therefore, it is strongly suggested that personal referral be used as a primary method to recruit Chinese elders to increase recruitment rates and shorten the recruitment period. Personal referral can also be used in conjunction with media advertising and flyers (Li et al., 2006; Li et al., 2008).

Special Techniques for Recruiting Younger Chinese Elderly

Recruiting Chinese immigrants who are 60 to 70 years old can be challenging. This may be due to their social activities, working status (some had not retired yet), or their family responsibilities, such as taking care of their grandchildren. Helpful strategies include a use of personal referral from health care providers or friends to enhance recruitment as well as communicating with gatekeepers in Chinese communities. In addition, to avoid scheduling conflicts or to overcome time constraints that Chinese elders have, investigators may interview patients around weekends or holidays, since potential participants may have a break from their work or family responsibilities during these specific time periods. Additionally, connecting with patients on Chinese holidays, such as Chinese New Year, can help establish a good relationship between patients and researchers as Chinese are less reluctant to talk to strangers during a holiday season. Designating a convenient location, such as a local library that is close to a potential participant's home, can also make study participation easier (Gallagher-Thompson et al., 2006; Taylor-Piliae & Froelicher, 2007; Wang & Chan, 2005; Wong et al., 2008).

Effective Communication and Health Education Using Participants' Native Language

Minimizing communication barriers to facilitate participant understanding is very important. Many older Chinese immigrants have low health literacy and low acculturation that hinders patients' understanding of the process for effective disease management and the importance of conducting scientific studies to promote efficacious strategies to improve health outcomes, such as blood pressure control (Li et al., 2006; Li et al., 2008). Therefore, it is suggested that all educational materials be written in simple language and include Chinese translations (Chao et al., 2011; Giarelli et al., 2011). Professional translation services and bilingual staff members should be hired to communicate with patients in their native language about the study purpose,

potential benefits of participating in the study, level of involvement and what that entails, and incentives to compensate participants for their time and efforts (Chao et al., 2011; Giarelli et al., 2011; Li et al., 2006; Li et al., 2008).

Cultural Competency

Exercising cultural competency is another important strategy and requires being respectful and knowledgeable of the cultural needs of the served population (Li et al., 2006; Li et al., 2008). Researchers should discuss cultural beliefs and practices with potential participants to understand and dispel misconceptions and social stigma about disease (Kwok & Fong, 2014). In addition, researchers must be aware that decisions are made by not only the participant, but also family members who act as gatekeepers (Levkoff & Sanchez, 2003) and may advise against research participation to protect the family from social stigma or when there is no perceived benefit (Brugge et al., 2005). Therefore, researchers should not only work with patients but also their family members on study recruitment.

Additionally, researchers should adopt personal and face-to-face approaches to facilitate recruitment, such as using a comfortable physical zone for interviews and prohibiting discussion about death or dying (Gallagher-Thompson et al., 2006; Taylor-Piliae & Froelicher, 2007). Furthermore, researchers should work carefully with some challenging subgroups, such as Chinese elders who stay longer in the United States, as those who have lived longer in the United States may have a more cynical view of the health care system. They may not respect medical authorities or may have negative perceptions about the U.S. health care system (Li et al., 2008). For this population, it is crucial to explore their perceptions about participation in clinical studies by attending to their verbal and non-verbal messages and discussing with them about potential misconceptions about study participation.

Trustworthy Relationships

Establishing relationships with community leaders provides opportunities for community trust. It ensures that the research is building towards meaningful outcomes or information for the community (Giarelli et al., 2011; Lee-Lin, Menon, Nail, & Lutz, 2012). For example, Levkoff et al. (2003) noted that study participants and researchers often have conflicting goals. Participants and community leaders often perceive researchers as an elite power structure that is disinvested in community well-being which leads to distrust (Levkoff & Sanchez, 2003). Because of unfamiliarity with the nature of the research, many older Chinese immigrants will not join unless they are "sick"

and only if advised by their physician (Taylor-Piliae & Froelicher, 2007). The conception that only “a privilege of sick people” should be dispelled by providing more information about the study and importance of participations to help advance health science and establish a healthier Chinese community. Therefore, those focusing on community support through positive intervention will flourish by demonstrating goodwill (Levkoff & Sanchez, 2003). As a result, it is suggested that programs that nurture rapport between researchers and communities be a first priority for a researcher to ensure successful recruitment of older Chinese patients. Given this, forming advisory groups made of community members and leaders (i.e., doctors, nurses, pharmacists, and government officials) to advise on the recruitment of a target minority population will help ensure effective and faster recruitment of older Chinese immigrants (Levkoff & Sanchez, 2003; Lin, Finlay, Tu, & Gany, 2005; Wong et al., 2008).

Address Misconceptions

Successful recruitment campaigns should dispel mistrust and convey the program’s benefits to personal health. Researchers should educate participants that seeing a doctor is not only beneficial for curing sickness but also preventing disease (Lin et al., 2005; Wang & Chan, 2005). Misconceptions that clinical trials are limited to “sick” people should be corrected. Also, the study design should be adapted to the preferred learning style of Chinese immigrant adults who attach meaning to their cultural experiences (Wang & Chan, 2005). For example, group discussion may be a culturally appropriate way to deliver health care messages to Chinese men and those with low literacy because members of the group can use peer-relationships to help dispel some individual misconceptions about the study (Chan, 2012).

Additionally, social stigma about a disease, such as attributing heart disease to bad luck, should be carefully discussed with potential participants (Brugge et al., 2005; Chao et al., 2011; Gallagher-Thompson et al., 2006). The researcher should be culturally competent and show her/his understanding of patients’ concern about social stigma. Accordingly, strategies to dispel patient’s misconception should be discussed, which in turn improves recruitment rate.

Incentives

Providing incentives is important to promote recruitment. Since many Chinese have a low socioeconomic status, there is an unavoidable struggle between saving money for living expenses and seeking health care and participating in health studies. Offering incentives can help increase their motivation to participate and com-

plete the study (Giarelli et al., 2011; Lee & Cheng, 2006).

Locations

Proper research site selection (i.e., outpatient clinic or health care agency) is also a key factor for successful recruitment. Networking and collaborating with hospitals, community centers, and ethnic clubs frequented by the target population will heighten visibility, which in turn increases successful recruitment. It is also advised that researchers should actively participate in community activities, such as community advisory board meetings, to know the populations that various community agencies/hospitals serve so they know whom to contact to meet their research goals and the needs of the community. This way can increase the chance that a researcher chooses an appropriate research site for successful recruitment.

In addition, since inadequate transportation is another major barrier, it is crucial to arrange a convenient interview location to ensure successful completion of all interviews. (An interview location is different from the aforementioned research site. Here it is referred to as a location where a patient will physically be interviewed.) Many Chinese elders do not own a car so they rely on their adult children or take public transportation. Therefore, researchers need to discuss transportation issues and make sure it is realistic for potential participants to travel to an interview site. If possible, a researcher may consider going to participants’ home or a nearby location, such as the community library close to participants’ home, rather than asking participants to travel to a research site (e.g., clinical office).

Conclusion

In summary, we identified recruitment barriers from an extensive literature review. The barriers were younger Chinese elders (i.e., 60-70 years old), low health literacy, longer LOS in the United States, low acculturation, time constraints, social stigma about study participation, and mistrust of researchers. Recognition of these barriers is critical in identifying strategies to ensure successful recruitment of older Chinese immigrants and to shorten the recruitment period. To facilitate recruitment and improve response rates among older Chinese immigrants, several strategies can be used, including convenience sampling, having a skillful personal approach for recruiting younger Chinese elders, communicating effectively, being culturally competent, establishing a trustworthy relationship, addressing misconceptions, and meeting in a convenient location for participants.

Limitations

Our review has a few limitations. Our focus on older Chinese immigrants (i.e., ≥ 60 years old) may limit the application of the findings to younger Chinese immigrants (e.g., < 60 years old). For this review, studies were only included if there were more than 25 Chinese immigrant participants. The arbitrary cutoff might have excluded some clinical trials. Our review was based on 13 clinical trials that only included 4,753 older Chinese immigrants. Further investigation is warranted for reproducibility.

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