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HHS Public Access
Author manuscript
Aging Ment Health. Author manuscript; available in PMC 2023 September 27.

Published in final edited form as:
Aging Ment Health. 2023 ; 27(10): 1956–1964. doi:10.1080/13607863.2023.2213646.

Social network and mental health of Chinese immigrants in affordable senior housing during the COVID-19 pandemic: a mixed-methods study

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Abstract

Objective: Chinese immigrant older adults who live in affordable housing are at high risk of experiencing social isolation during the COVID-19 pandemic, which can affect their mental health. Using a triangulation mixed-methods approach, this study describes Chinese immigrant older adults' social network, mental health status, and their associations during the pandemic.

Methods: Semi-structured in-depth interviews were conducted with 26 Chinese immigrant older adults from June to August 2021. The structure and characteristics of participants' social networks were assessed with a name-generating approach. Mental health status was self-reported with Geriatric Depression Scale and UCLA loneliness scale.

Results: This sample (mean age = 78.12, 69.23% female), on average, had 5.08 social ties in their network, and 58% were family ties. Participants reported decreased social contact, family and friends interaction patterns specific to immigrants, and constantly being in a low mood and bored. Having closer relationships with others and maintaining the same or higher contact frequency after COVID-19 onset was associated with fewer depressive symptoms. Resilience from religious beliefs, neighbors as role models, and wisdom learned from past experiences were reported.

Conclusion: Knowledge built in this study can inform respondence to future crises like the COVID-19 pandemic in affordable housing settings serving older immigrant populations.

Keywords

Migration and aging; social relationships; loneliness; depression; resilience

Disclosure statement
No potential conflict of interest was reported by the authors.

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Introduction

Residents of affordable senior housing communities face exceptional challenges during the COVID-19 pandemic. The aggregated living condition increased their risk of being exposed to the contagious disease (Kyler-Yano et al., 2022). Older adults who are eligible for affordable housing are with lower incomes and have less resources for coping with the crisis brought by the pandemic, and they could be subjected to worse mental health outcomes (Krouse, 2020; Lebrasseur et al., 2021). Chinese immigrants who live in senior housing communities in the United States (US) could have a higher likelihood of experiencing social isolation during the COVID-19 pandemic due to the concerns of being infected and the increased anti-Asian sentiments in society (Gao, 2021; Li et al., 2021). Furthermore, this group is a non-traditional Chinese older adult population compared to those who live with their adult children (Kim et al., 2019). Nonetheless, it is less investigated how and to what extent the pandemic affected this population's social network and mental health. Build empirical evidence on influencing factors of mental health for immigrant older adults residing in aggregated living environments could contribute to developing practice and policy strategies to prepare for emergency like the COVID-19 pandemic.

Foreign-born older adult immigrants have unique stressors during the COVID-19 pandemic, which could be posed by limited English proficiency, lower level of social participation compared to native-born counterparts, and disengagement with home countries because of the COVID-related travel restrictions. Even before the pandemic, older immigrants in the US were more likely to suffer from depression than their native-born counterparts, which could suggest difficulties in adapting to a new socio-cultural environment (Lum and Vanderaa, 2010). Foreign-born older adults in the US are less likely to feel a sense of belonging in the nation they migrated to (Gao, 2021). The COVID-19 pandemic further evoked and manifested xenophobia. The disputes over the origin of the virus also put a significant amount of pressure on the Chinese American community. Harassment and physical attacks toward foreign-born Asian older adults have been repeatedly reported in the media (Chin, 2021; Chung, 2021). Chinese older immigrants could reduce social contacts to avoid becoming a victim of hate crimes (Gao, 2021). Additionally, the stay-at-home order deeply affected the older adults' social life. However, the literature has yet to describe the structures and characteristics of Chinese immigrant older adults' social networks during the pandemic. In this study, we operationalized the structure of the social network as the size (number of contacts) and the composition (percentage of family ties) of one's interpersonal network. The characteristics of social networks are contact frequency, closeness with others, and change in contact frequency before and after the onset of the COVID-19 pandemic.

The stress-buffering model posits that social support from family and close friends can buffer the negative impact of stressful events on one's physical and mental health (Cohen & Wills, 1985). Furthermore, socioemotional selectivity theory theorizes that, due to perceived time restrictions, older adults emotion-oriented more than knowledge-oriented goals (Carstensen, 2006). The abovementioned theories suggest that social connectedness is essential for mental health, especially among older adults. Chinese immigrant older adults often are deeply influenced by collective values, and mental health concerns can be viewed as a psychological weakness and deviance from the social norm (Ma et al., 2013). With a

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deep cultural need for social approval for one's behavior, Chinese immigrant older adults might experience significant stigma and choose to solve mental health issues by "avoiding bad thoughts and exercising willpower" (Atkinson and Gim, 1989). The isolating nature of the pandemic negatively impacted the mental health of many people. However, how and to what extent has the pandemic impacted the mental health of older Chinese immigrants worth to be scrutinized, given the unique set of cultural considerations. To gain a more thorough understanding of the mental health of this population within the context of COVID-19 could contribute to developing effective mental health screening and prevention programs for Chinese and other East Asian immigrants.

Previous studies on Chinese immigrant have emphasized their family relationships, and fewer studies have investigated friendship with this population (Guo et al., 2011; J. Liu et al., 2017, 2021). Indeed, because of the filial piety tradition, older Chinese immigrants are often most closely related to their families and get the most support and assistance from their adult children (Guo et al., 2011; J. Liu et al., 2017). Nonetheless, research on native-born US older adult population supported the benefit of having a variety of social ties, including friends and weak social ties (Fingerman et al., 2020). Regular interactions with non-family ties were associated with a more active lifestyle and increased psychological wellbeing (Fingerman, 2009; Fingerman et al., 2020). Unfortunately, these non-family social ties are most likely affected by the pandemic: individuals might choose to reduce their contact with friends instead of the immediate family. To better understand the role that family and non-family ties play on the Chinese older immigrants' wellbeing and mental health during the pandemic, we examined their contacts with both family and friends networks, described their mental health status, and assessed whether social network characteristics would be associated with mental health outcomes.

In this study, we explored Chinese older immigrants' social network composition and changes in social contacts before and after the onset of the pandemic. We asked the participants to elaborate on how they maintained contact with their family and non-family ties during the pandemic. Within the affordable senior housing setting, this paper explored how Chinese older residents' social networks changed before and after the COVID-19 pandemic and assessed the extent to which their social networks' characteristics affected their mental health during the pandemic. The knowledge produced in this study can inform the planning for responding to future crises in senior living settings serving older immigrants.

Methods

Study design

This study employs a triangulation mixed methods approach to evaluate the social network through semi-structured interviews and assesses loneliness and depressive symptoms with scales. Both the qualitative and the quantitative data collection were completed in a single interview session. Each interview session was guided with a semi-structured interview guide followed by questionnaires. A triangulation mixed methods study design analyze data from different sources regarding the same topic to facilitate interpretation of the phenomena (Palinkas et al., 2011). The current study uses quantitative questions to describe describes

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the structure and composition of Chinese older adults' social networks, their perceived loneliness, and depressive symptoms. In contrast, the qualitative data is the participants' own narratives of their social interaction during the pandemic and describes loneliness and depressive symptoms using their own words. The qualitative and quantitative data were complimentary of each other.

Recruitment

Participants were recruited in collaboration with an affordable senior housing community in Los Angeles, California. Individuals who identified as Chinese immigrants and aged 65 and above were eligible to participate. Two staff members spread the word about the research project and distributed flyers with recruiting information to the residents. Individuals interested in participating in the study provided their contact information, and the research team reached out to them to seek informed consent and scheduled interviews. Participants were asked to refer other residents to participate. In total, 28 residents indicated their interest in participating in the study, but two eventually declined the interview due to health issues. At the end of data collection, 26 participants completed the interviews. Information saturation was used as the criterion for having sufficient sample size and terminating data collection. We used Consolidated criteria for reporting qualitative research (COREQ) to guide the research planning and reporting (Tong et al., 2007). The recruitment and data collection took place from June to August 2021.

Interviewers

We conducted semi-structured interviews *via* videoconferencing or phone calls and had conversations with participants in Mandarin or Cantonese, which were the participants' preferred languages. Five research team members, who are Mandarin or Cantonese native speakers, conducted the interviews. Three of the interviewers were female, and the other two were male. The first author designed training protocols for the other interviewers, which include readings, watching video tutorials for conducting semi-structured interviews, and a practice interview session to familiarize the interviewer with the interview questions. Two interviewers attended each interview: one hosted the conversation, and the other took notes. The participants did not know the researchers before participating in the study.

Interview procedures

Each interview took about an hour, during which participants described their social network and nature of the social contacts, changes they noticed after the onset of the pandemic, and their mental health status during the pandemic. The participants received a $25 gift card upon completing an interview. With informed consent, interview sessions were voice recorded and transcribed verbatim for analysis. Two participants refused to be voice-recorded, and we took thorough notes to capture the essence of these two interviews. The study procedure was reviewed and approved by the Internal Review Board at the University of Southern California.

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Quantitative measurements

Mental health—Two aspects of mental health were measured in the current study: depressive symptoms, and loneliness. Depressive symptoms were assessed with the 15-item Geriatric Depression Scale (GDS-15) (Marc et al., 2008). The GDS total score was categorized to discern those with normal mental health status (0–4), mild depression (5–8), moderate depression (9–11), and severe depression (12–15) (Marc et al., 2008). Three-item UCLA loneliness scale was used to evaluate levels of loneliness: participants reported how often they felt "lack companionship," "left out", and "isolated from others." (Hughes et al., 2004; T. Liu et al., 2020). Previous research has translated and validated these scales in Chinese (Lin et al., 2016; T. Liu et al., 2020). A sum score was calculated for the 3-item UCLA loneliness scale (Hughes et al., 2004). The scale score ranged from 3–9, with a higher score indicating a higher level of loneliness. A score between 3 and 5 suggests the person is "not lonely", and a score equal or higher than 6 suggests that the person is "lonely" (Steptoe et al., 2013).

Social network—Participants' egocentric social networks were assessed by asking them to name up to 8 individuals they "most often discussed important things with" using a name-generator approach. For each name mentioned, a set of questions were asked to assess the nature of their relationships (e.g., partner, spouse, parent, child, friend, coworker, hired caregiver, pastor, etc.), frequency of contact (1 = less than once a year, 8= every day), emotional closeness (1= Not very close, 4 = extremely close), change in contact frequency when compared to before the pandemic (more often, the same, less often), and methods for keeping contact during the pandemic (meet in person, phone calls, emails, video calls, chat groups, social media, and other). The social network questions were adapted from the National Social life, Health, and Aging Project (NSHAP) study (Cornwell et al., 2009), and we added a question on contact methods during the COVID-19 pandemic. The social network interview questions can be found in Appendix I.

Sociodemographic—Variables assessed included age, sex, marital status, education level, years living in the US, English proficiency (poor, fair, good, very well), living arrangement, and self-rated health. The self-rated health score ranged from 1–5, higher score indicates better health.

Data analysis

The qualitative and quantitative data were used to understand the same phenomenon: the social connectedness and mental health of Chinese immigrants in affordable senior housing during the COVID-19 pandemic. The quantitative measures are objective assessments, and the qualitative methods provide depth of understanding and interpretation.

Quantitative analyses were conducted with Stata 15 SE (StataCorp, 2017). We run descriptive analyses for sociodemographic variables. We conducted an egocentric social network analysis (Djomba & Zaletel-Kragelj, 2016; Perry et al., 2018). Social network size is a structural measure operationalized as the number of close contacts the participants nominated. The percentage of family ties among the total social ties mentioned was calculated. To reflect the quality of the social network, we averaged the closeness, contact

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frequency, and change in contact frequency after the onset of the pandemic among the alters that each participant nominated. Participants' methods for keeping in contact with the nominated alters were summarized. Kendall's correlation analysis for a small sample was conducted to examine the associations between social network variables, loneliness, and depressive symptoms.

We conducted thematic content analyses with the qualitative data using QSR International's NVivo 12 software (Hsieh & Shannon, 2005). The interview recordings were transcribed with an algorithm-based auto-transcribing service and then double-checked by five research team members. Two of the 26 participants declined voice-recording yet accepted interviewers to take notes during the interview. Two interviewers attended these two interview sessions: one person mainly asked questions, and the other interviewer took detailed field notes to document the conversation as much as possible. Both interview transcripts and field notes were included in the qualitative analysis.

Cantonese and Mandarin write similarly in Chinese. Because the data information is often best captured in the original context, and also because the team has the language capacity, the qualitative data were coded and analyzed in Chinese by native speakers. We translated the representative quotations into English. The quotations were reviewed and edited by native English speakers and the research team, that are fluent in both English and Chinese, to ensure translation accuracy.

We took a directed thematic content analysis approach to analyze the qualitative data (Hsieh & Shannon, 2005). Codes were derived from the interview guide and novel themes that emerged from the data. Six coders formed three coding teams to analyze and compare their codes regularly. The team met weekly to discuss questions and reflect on new themes discovered in the coding process. The team achieved satisfactory interrater reliability for all interview transcripts (averaged Cohen's Kappa > 0.6) (McHugh, 2012). After finalizing the codes, the research team compared and condensed codes into themes. Subthemes were then developed, based on summarization of codes, to better reflect the distinct content aspects within the themes. Member checking, also known as participant or respondent validation, is a technique for exploring the credibility of results (Birt et al., 2016). After completing data analysis, the research team conducted member checking with phone calls, and participants were offered the opportunity to change or add any further information. The member checking feedback was integrated into the results reported. The study findings were also presented to community stakeholders, including staff members, interns, and board members of the affordable housing community, to share information learned and seek feedback.

Results

Sample characteristics

The sample characteristics of the participants are summarized in Table 1. The average age for the participants was 78.12 (SD = 7.91, range 65–92). About 69.23% of the participants were female. More than half (57.69%) of the participants had college or above education. The shortest duration of residing in the US was seven years, and the longest was 40 years,

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with a mean of 25 years (SD = 9.37). About 52.85% of the participants were married, 26.92% were widowed, 7.69% were divorced, 7.69% never married, and 3.85% reported being separated. Half of the participants lived alone. The vast majority (92.31%) considered themselves had less than good English proficiency. On a scale ranging from 1 to 5, the sample's mean self-rated health score was 2.92 (SD = 1.09).

Chinese older immigrants' social network during the COVID-19 pandemic

Quantitative findings—Table 1 shows the descriptive results of the quantitative measures of participants' social networks. The total number of contacts within participants' social networks ranged from 2 to 8, and the average size of social networks was 5.08 (SD = 1.74). During the pandemic, family-based social ties made up about 58% of all the social ties within each participant's self-reported social network. The score of the average frequency of contact with nominated alters was 6.33 (SD = 0.97), which indicates slightly more than once-a-week contact frequency. The mean closeness with nominated alters was 2.84 (SD = 0.66), just below "very close" on the 4-point scale. Compared to their frequency of contact with the nominated alters pre-pandemic, the averaged frequency of contact decreased (Mean=−0.18, SD = 0.48). The most-reported contact method with alters was meeting in person (96.15%), followed by phone calls (76.92%). About half of the participants used mobile technology to keep in contact with others, methods adopted including chat groups (46.15%), social media (53.85%), and video chat (30.77%). Only one participant reported using email to connect with others during the pandemic.

Qualitative findings—Older Chinese immigrants reported unique social network composition and contact patterns with others. We categorized the participants' social contacts into family ties and non-family ties categories.

Theme 1: uniqueness of family relationships among older Chinese immigrants

Subtheme 1.1: connections within immigrant families in the US

At the start of the pandemic, even family members in the US had to be separated for a while. ID28 found it challenging because, as immigrants, they had been through hardships together, and the family members were close-knit and mainly relied on one another for support.

> It was really hard for a long time because I wasn't able to see my family. Fortunately, I finally got to meet my brothers…We do not have many relatives. Since my brothers and I went through many ups and downs, we have been very close. I can only talk with my family with no reservations.
>
> (ID28, female, 72)

Using phones and mobile apps helped immigrant families in the US maintain contact during the pandemic. Those who could take care of their daily needs did not necessarily meet with family members in-person during the pandemic ("*Bigger and smaller issues, we discuss over the phone. That's about it.*" ID9, male, 86). For other participants, their adult children paid regular visits to them and provided tangible and emotional support, such as helping

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with their daily needs ("*My daughter is here to cook for us, help with grocery shopping and do laundry"* ID1, male, 89), checking in on them ("*Our son visits us weekly*." ID3, male, 89), and enjoying family time together ("*My daughter brings take-outs for us every other week*." ID19, female, 75). Some participants also reported visiting their adult children at their homes ("*It's easier for us to visit them. They have little kids that require a lot of attention*." ID18, female, 77). Older Chinese immigrants reported increased social contact with family members after the pandemic due to concerns about their health and safety ("*Increased. Because we worried and cared about each other*." ID20, female, 75).

Subtheme 1.2: international family ties

Participants reported close relationships with their families despite being separated in different nations. ID12 lived alone, and she had no other family members in the US. Even so, she made phone calls back home to her 95-year-old mother every day to stay connected. ID15 had video calls with her family during the pandemic, which made her feel their hearts were together despite being physically separated. The pandemic made it exceedingly difficult for them to travel and reunite, but she looked forward to when they could get together after the pandemic. Older immigrants are more likely to be challenged by the difficulties of dealing with long-distance relationships with families that are half the world away. Technology has been serving an important role for long-distance family members to keep connected. Talking to family members online buffered the stress that Chinese immigrant older adults may experience during the pandemic

> My son always smiles when he video chats with me. He said, "mom, you should spend every day happily with a smile. If there is anything that bothers you, don't keep it to yourself. You can discuss everything with us. Even though we are not physically with you, our hearts are with you." This warmed my heart. My daughter-in-law and grandson also treated me very well. My grandson said to me repeatedly, "grandma, do visit us when the pandemic is over!"
>
> (ID15, female, 71).

Theme 2: uniqueness of non-family relationships among older Chinese immigrants

Older Chinese immigrants reported various social relationships that were not family-based, including friends from their native country, neighbors, and connections made through formal organizations and informal groups. In some cases, friends provided family-like support to immigrants who did not have other families in the US.

Subtheme 2.1: international friend ties

Besides international family ties, many participants also reported having friends back in their home country. During the pandemic, they kept connections through social media. The most commonly used social media were WeChat and LINE.

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> I got most calls from LINE. Although I have been in the US for a long time, I still have many friends in Taiwan. And we are still in touch. During the pandemic, we have been checking in with each other.
>
> (ID16, female, 78)

Subtheme 2.2: neighbors

A few participants reported neighbors as significant social ties during the COVID-19 pandemic. ID11 found a way to interact with neighbors while being socially distanced. He shared food with neighbors that walked by his first-floor apartment. That was his way of showing that he cared about the neighbors. He also had more interpersonal interactions through that kind gesture. On the contrary, another participant (ID23) moved to senior housing right before the start of the pandemic and felt disconnected from the community. The common outdoor space of the senior housing played a vital part in the community for the residents to exercise and socialize, yet ID23 suggested insufficient space.

> The apartment sometimes gives us some food, and I cannot finish it every time. Because I live on the first floor, people walk by my place through a pedestrian path. I would stop them and give them food without visiting their homes. Pre-covid, we would visit each other. Now we exchange things on the balcony to avoid close contact.
>
> (ID11, female, 83)

> I don't know anyone here because I moved here at the beginning of the pandemic. Only younger residents come out to exercise. The older residents stay in their homes. I say hi to people when I see them, but we are not close. The park nearby is essential, but the space is too small for this many people. There is no place for exercise.
>
> (ID23, female, 70)

Older Chinese immigrants who are on their own and did not have other family members in the US were especially vulnerable during the COVID-19 pandemic. ID12 moved to the US alone and had no family for social support during the pandemic. She was physically attacked by a stranger, who hit her in the eye, on her way to grocery shopping. Due to language barriers and insecure feelings toward the societal environment, she chose not to call 911 after the incident. Instead, she sought help from her "big sister," who was a neighbor. Older immigrants who lived alone during the pandemic could be especially vulnerable when confronted with harassment and discrimination. Our findings reflect the older Chinese immigrants' tendency to seek help from their neighbors as substitutive family members rather than resort to authorities and professionals in the US, such as the police and physicians.

> When I got home, I immediately called my big sister (a neighbor) to ask how to deal with this? She advised me to ice the injured area immediately.
>
> (ID12, female, 75).

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Subtheme 2.3: group/organization-based contacts

During the pandemic, the outdoor exercise groups formed their community. Being isolated was challenging for the participants' physical and mental health. After getting vaccinated, they decided to loosen up and started exercising in an open space.

> I have seen people dancing to music in the park since June 15th, and more people have joined them. It made sense to me because we have been isolated for so long, which is not good for our health. So there have been many people joining the dancing group.
>
> (ID2, female, 74)

Adult Day Health Care (ADHC) centers offer a venue for older Chinese immigrants to interact with others after getting vaccinated. Participants said they were isolated for too long and were in desperate need of some everyday activities.

> When I made phone calls to friends, they seemed bored, watching TV all day long. After getting vaccinated, we hung out at ADHC several times. The ADHC also asked us, "Do you want to come? Do you need this service?" We were in desperate need because everyone had been in their home for too long.
>
> (ID25, female, 92)

Churches were essential for older Chinese immigrants to find inner peace after the start of the pandemic. ID 23 reported she had more time to join church activities because of the stay-at-home order. Talking to church friends regularly, she felt less fearful and anxious about the pandemic.

> Since the start of the pandemic, there have been more church activities, and I have had more free time to join them online or over the phone. We talk to church friends at least once a day, sometimes even two or three times a day. I consider the church as my home. Because we supported and cared for each other, I felt less afraid of uncertainty. I have God in my heart and entrust myself to God.
>
> (ID23, female, 70)

Chinese older immigrants' mental health in the pandemic

Quantitative findings—As shown in Table 1, on a scale ranging from 0–6, the mean score of loneliness was 0.85 (SD = 1.69), suggesting the average loneliness level experienced was low. A majority (76.92%) did not have depressive symptoms, 7.69% had mild depressive symptoms, 11.54% had moderate depressive symptoms, and 3.85% had severe depressive symptoms as categorized by their GDS-15 scores.

Qualitative findings—Participants discussed the influence of social distancing order on their mental health status: some are negative influences, such as stress, loneliness, and depressive thoughts; others reported positivity and resilience. The qualitative findings report participants' loneliness, depressive symptoms, and sources of resilience using their own words.

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Theme 3: mental health impact

Subtheme 3.1: loneliness and depressive symptoms

Although the averaged GDS score reported by participants was below the criterion of having depressive symptoms, older Chinese immigrants often used the word "boring" to describe the sense of emptiness due to lacking social contacts and activities, which could signify mild depressive symptoms. Many of them described their experience of loneliness. Participants reported that the days felt long without much to do. ID19 attributed the sense of loneliness to the anti-Asian sentiments. The fear of being robbed or attacked further prevented him from going outside the apartment.

> I cannot go out because of COVID. I do feel lonely sometimes. Before the pandemic, I would go to the ADHC four days a week. I usually go in the morning and take a nap after lunch, making me feel a day goes faster. So, I occasionally felt lonely over the past year.
>
> (ID11, female, 83)

> I felt empty. Watching TV showing various news all day long, I did not feel like getting up and moving. So boring!
>
> (ID17, female, 89)

> I am afraid of going out because I don't know if someone will rob or attack me.
>
> (ID19, female, 75)

Subtheme 3.2: resilience

Despite the mental and social distresses caused by COVID-19, the participants articulated their sources of resilience that had protected them from being depressed. ID8 reported having a neighbor as her role model who had encouraged her to be more physically active.

> The person who lives upstairs had cancer twice. After being treated with chemotherapy, he lost all his hair and became so skinny. But he still takes a walk and keeps active every day, much more persistent than me. He is my role model. After seeing him, I started to take a walk, and now I can walk more miles.
>
> (ID8, female, 79)

Having meaningful activities, such as reading and cooking, helped ID27 and 28 spend their days during the pandemic. Other participants also gained resilience through spirituality. For instance, ID20 commented on her interaction with hummingbirds and felt connected with nature, and ID15 sang with her churchmates every day and found a sense of connection and self-worth. Having everyday activities that the participants enjoyed could help to build a sense of normality, meaning, and connectedness, and such positive psychological feelings could help buffer the potential negative mental health impacts brought by the pandemic. Having role models and inspirational others could also help the residents of affordable senior housing to overcome the difficulties during this challenging time.

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> I actually don't feel stressed. It will be fine if you protect yourself. If I felt bored, I would read books. I have many books which I haven't read. Right now, I can take my time and read.
>
> (ID27, female, 77)

> Because I have already watched TVs repeatedly, there is nothing new for me. But now, I spend all my time working on helping kids with their stage plays and cooking with new recipes.
>
> (ID28, female, 72)

> Many hummingbirds are around me every day. After I shared this with my pastor, he said God sent me to this community as an angle to help people. Because of my energy, hummingbirds, who usually keep their distance from humans, actually like me.
>
> (ID20, female, 72)

> We sang a lot of songs every day. We have so many songs (from the church). We would play them first and then learn to sing them.
>
> (ID15, female, 71)

Associations between social networks and mental health

Table 2 shows Kendall's correlation coefficients between social network and contact variables, loneliness, and depressive symptoms. Loneliness and depressive symptoms were positively corrected (tau-$b = 0.54$, $p<.01$). A higher averaged closeness with nominated alters in the network (tau-b $=-0.31$, $p<.05$), and no-change or increased contact frequency after the onset of the pandemic (tau-b $=-0.35$, $p<.05$) was related to lower level of depressive symptoms among older Chinese immigrants. The social network size, percentage of family ties in social networks, and averaged contact frequency were not associated with depressive symptoms. None of the social network variables were related to loneliness. Closeness was positively related to the contact frequency (tau-$b = 0.32$, $p<.05$) and no change or increased contact frequency after the pandemic (tau-$b = 0.29$, $p<.05$).

Discussion

This study used a mixed-methods approach to describe the COVID-19 pandemic's influence on older Chinese immigrants' social network structure, characteristics, and their mental health. The quantitative and qualitative data collected in this project collectively answer the questions of what Chinese older immigrants' social networks look like, how they kept in contact with family and friends, and their mental health status during the COVID-19 pandemic. The quantitative data describes the size and structure of their social network, and assessed how does the social network characteristics affected older Chinese immigrants' mental health. On the other hand, the qualitative quotations depict Chinese immigrants' perceptions of their social relations and psychosocial wellbeing. Although the participants were connected with family and friends during the pandemic, they reported a reduced frequency of social contact compared to before the pandemic. Common negative affect experienced by Chinese immigrant older adults during the pandemic includes a sense of

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emptiness, loneliness, and fear. Their sources of resilience were from having meaningful daily activities, spirituality and having others as role models. Closeness with others in the social network and no change or increase in contact frequency after the onset of the pandemic were associated with lower depressive symptoms.

Having access to technological tools helped Chinese immigrant older adults engage in online social activities and keep in contact with family and friends who did not live with them. Compared to the percentage of family ties reported in NSHAP (67%) (Cornwell et al., 2009), the percentage of family ties in the social network reported by older Chinese immigrants in the current study is lower (58%). It could be that the participants moved to the US and lost regular connections with some family members. The qualitative interview quotations also highlighted the diverse social network of non-family relationships for older Chinese immigrants, including friends who live in their native country, neighbors, ADHC, and church friends. A diverse social network has been shown to benefit older adults' physical and mental health (Fingerman, 2009). Individuals with a greater variety of social ties have been found to have more physical activities and positive mood than those with social networks of simpler structures (Fingerman et al., 2020). However, the connection with non-family ties is more likely to be interrupted by a crisis like the COVID-19 pandemic. Creating opportunities for social interactions with non-family ties during challenging times like the COVID-19 pandemic could serve as a strategy for behavioral intervention programs to promote physical activities and prevent mental health issues.

Chinese immigrant older adults in the US reported unique challenges in staying connected with family members who are in different countries. Due to travel restrictions, many of the participants have not visited their families for over two years. In addition to the separation from family, Chinese immigrant older adults face discrimination and unjust treatment that could be potentially related to the COVID-19 pandemic (Li et al., 2021). The anti-Asian sentiment that was evoked by the pandemic could cause existential loneliness among Asian immigrant older adults (van Tilburg et al., 2021a, 2021b), feeling rejected by US society. One participant commented that he avoided going outside because of the danger of being a victim of assault. Senior living facilities could also consider providing education and training to Chinese and other Asian immigrant older adults on protecting themselves from discretionary events.

The relatively low level of loneliness and depressive symptoms, compared with what was found at the beginning of the pandemic among older adults (Kotwal et al., 2021; van Tilburg et al., 2021a), might be explained by the resilience observed among the participants. Many participants built a sense of normality and connectedness during the pandemic by regularly attending online church events, findings enjoyable daily activities, gaining inspiration from role models, and practicing spirituality by interacting with birds in the community. Older age was found to be associated with more resilience against the negative mental health impact brought by the pandemic (Parlapani et al., 2021). Individuals who have experienced adversities in life are less likely to be affected by an unexpected event and report less anxiety and depressive symptoms, and such mental strength has been increasingly recognized among older people (Parlapani et al., 2021). Socioemotional selectivity theory also suggests that older adults tend to steer their attention to positive emotional experiences instead of negative

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ones (Carstensen, 2006). We found similar narratives expressed by the Chinese immigrant participants, who reported finding meaning and peace despite the challenging environment.

Closer relationships with others in their egocentric social network and the same or higher contact frequency than before the COVID-19 pandemic were associated with fewer depressive symptoms. These findings support the posits of the stress-buffering model: social relationships are protective of adverse mental health outcomes (Cohen & Wills, 1985). Nonetheless, the size of social network and contact frequency were not associated with the mental health of Chinese immigrant older adults. The quality of the social network and change in contact patterns seems to have more influence on the mental health outcomes in this population during the pandemic compared to the number of social contacts in their social network. None of the social network variables were related to the experience of loneliness. It could be because loneliness is a shared experience during the COVID-19 pandemic, differences in one's social network structure may not influence the sense of loneliness in this special case.

The current study findings can be limited by the modality of data collection. In the Online interviews, especially those conducted over the phone, participants may not be able to engage in interactive activities such as drawing their social network with paper and pencil. The findings might not be generalizable to Chinese immigrants in other regions of the US and other countries as the data was collected with a convenience sample, and the participants were largely recruited from a single affordable senior housing facility. More than half of the participants had college or above education, 70% were female, half were married, and they had lived in the US for an extended period. These sample attributes need to be considered when interpreting the results, and our findings might not be representative of individuals who do not share these characteristics. Although the 3-item UCLA loneliness scale has been widely adopted in longitudinal panel studies with a focus on aging (T. Liu et al., 2020; Yu et al., 2021), we found it may not be ideal for data collection with a small sample size as it might also be limiting the detectable variance of the loneliness score. The current study focused on the social network and connections of the participants, and the experience of social isolation might be under-reported due to the design of the interview questions. Using a standardized measure of social networks from NSHAP is a strength of the current study, which makes our findings more comparable to other works with different populations. Future studies could consider building on this topic with more sophisticated study designs. For instance, a longitudinal mixed-methods study might be able to capture the change in social connectedness and mental health over time and assess the long term impacts of the pandemic.

The COVID-19 pandemic has been recognized as a crisis and a continuing challenge for organizations serving older adults. Senior housing and aging service agencies can learn from this experience to formulate a preparedness plan for infectious disease, i.e., have a plan for when the pandemic hits and a plan for exiting the pandemic. For example, organizing regular online/outdoor activities for the residents (e.g., exercising, cooking classes, reading) could help prevent loneliness and depressive symptoms during a lockdown. Online lessons can also benefit home-bound older adults during normal times. Building such capacities before an emergency like COVID-19 hits the senior housing community could buffer the stress and

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challenges that the older adults and the staff members of senior living facilities might face. As the world is, hopefully, exiting the pandemic, it is critical that older adults have access to equal opportunities to be socially engaged as younger adults. Providing necessary support (e.g., technology training and transportation services) and clear guidelines could help older adults feel safer when returning to pre-pandemic lifestyles.

In conclusion, the current study described the social network and mental health status of Chinese immigrant older adults living in an affordable senior housing community during the COVID-19 pandemic. Both family and non-family social ties are essential for Chinese immigrant older adults during this challenging time. Technology was vital in keeping immigrant older adults socially connected, especially with family and friends who are not in the US. Chinese immigrant older adults also demonstrated resilience and strength that protected them from having adverse mental health outcomes. The knowledge produced in this project will help develop interventions to alleviate stress, prevent depressive symptoms among residents in senior housing, and inform the planning for responding to future crises in affordable senior housing.

Acknowledgments

We thank Luyan Yang, Charlene Li, Coco Yang & Lily Kung for helping the research team recruit participants and collect data. We appreciate Graham DiGuiseppi for providing feedback on the social network analysis methodology. Lastly, we thank our participants for sharing their knowledge and lived experiences with us.

Funding

This study is supported by National Institute on Aging (NIA) under grants F99AG068492 and K00AG068492.

Appendix I

Social Network Interview Guide

1. Looking back since the start of COVID-19, who are the people with whom you most often discussed things that were important to you? Please list these people. You may refer to these people in any way you want; for example, you may use just their first names or nicknames. We are not interested in the identities of these persons; we just need to have some way to refer to them so that when we ask you some follow-up questions we both know whom we are talking about.

   1a. Which of the following best describes [NAME]'s relationship to you? (PROMPT IF NEEDED: So this person is your …)

   - Spouse
   - Ex-spouse
   - Romantic/Sexual partner
   - Parent
   - Parent in-law
   - Child

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- Step-child
- Brother or sister
- Grandchild
- Other relative of yours
- Other in-law
- Friend
- Neighbor
- Co-worker or boss
- Minister, priest, or other clergy
- Psychiatrist, psychologist, counselor, or therapist
- Caseworker/Social worker
- Housekeeper/Home health care provider
- OTHER (SPECIFY) ________________

  Are there any more?

  READ LIST OUT LOUD. MAKE CERTAIN THERE ARE NO DUPLICATES.

  [Ask questions 2–5 for each contact listed.]

2. How often do you talk to this person?

- Every day
- Several times a week
- Once a week
- Once every two weeks
- Once a month
- A couple of times a year
- Once a year
- Less than once a year

3. How close do you feel is your relationship with [NAME]? Would you say not very close, somewhat close, very close, or extremely close?

- Not very close
- Somewhat close
- Very closes
- Extremely close

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4. How has your frequency of contact with [NAME] changed after the start of COVID-19?

- Became more often
- Remained the same
- Became less often

5. How do you contact [NAME]?

- Meet in person
- Phone calls
- Emails
- Video calls
- One-on-one chat with social media (e.g., WeChat, LINE, WhatsApp)
- Group chat with social media
- Other (Specify) ______

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Table 1.

Sample characteristics and descriptive results of their social network and mental health ($N = 26$).

	Mean/n	SD/%	Range
Age	78.12	7.91	65–92
Sex-Female	18	69.23%	
Education			
Elementary school	1	3.85%	
Middle school	4	15.38%	
High school	6	23.08%	
College and above	15	57.69%	
Years living in the US	25.06	9.37	7–40 years
Marital Status			
Married	14	52.85%	
Widowed	7	26.92%	
Divorced	2	7.69%	
Single, never married	2	7.69%	
Separated	1	3.85%	
Living Alone	13	50%	
English proficiency - less than good	24	92.31%	
Self-rated health	2.92	1.09	1–5
Size of Social network	5.08	1.74	2–8
% of Family ties	–	58%	
Contact frequency[1]	6.33	0.97	4.17–8
Closeness[2]	2.84	0.66	1.5–4
Change in contact frequency[3]	−0.18	0.48	−1–1
Methods for keeping in contact			
In-person	25	96.15%	
Phone	20	76.92%	
Email	1	3.85%	
Video chat	8	30.77%	
Social Media	14	53.85%	

	Mean/n	SD/%	Range
Chat groups	12	46.15%	
Three-item UClA Loneliness[4]	3.85	1.69	3–9
Lonely: UClA Loneliness score > 5	3	11.54%	
GDS-15	3.38	3.73	0–13
Normal: 0–4	20	76.92%	
Mild depressive symptoms: 5–8	2	7.69%	
Moderate depressive symptoms:9–11	3	11.54%	
Severe depressive symptoms: 12–15	1	3.85%	

Note: Appendix I documented the quantitative questions used in the interview.

[1] Scale possible range from 1–8, with a higher score indicates mode frequent social contact. 1 = less than once a year, 8= every day. See Appendix I, question 2 for more details.

[2] A higher score indicates more closeness, 1= Not very close, 4 = extremely close. See Appendix I, question 3 for more details.

[3] Participants reported whether their frequency of contact with nominated alters decreased (−1), remained the same (0), or increased (1) after the onset of the pandemic.

[4] Three-item UClA loneliness scale score ranged from 0–6, with a higher score indicating a higher level of loneliness.

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Table 2.

Kendall's correlation coefficients between loneliness, depressive symptoms, and social network variables ($N = 26$).

	1	2	3	4	5	6	7
1. Depressive symptoms	1.00						
2. loneliness	0.54**	1.00					
3. Social network size	0.08	0.22	1.00				
4. Percentage of family ties in network	−0.02	−0.03	−0.05	1.00			
5. Contact frequency	−0.19	−0.20	0.14	0.24	1.00		
6. Closeness	−0.31*	−0.28	−0.19	0.13	0.32*	1.00	
7. Change in contact frequency	−0.35*	−0.18	−0.18	0.32*	0.21	0.29*	1.00

Notes.

* $p<.05$.

** $p<.01$.