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Research article

Characteristics Associated with Psychological, Physical, Sexual Abuse, Caregiver Neglect and Financial Exploitation in U.S. Chinese Older Adults: Findings from the Population-Based Cohort Study in the Greater Chicago Area

Xinqi Dong [1,*], Ruijia Chen [1], and Susan K. Roepke-Buehler [1,2,3]

[1] Rush Institute for Healthy Aging, Rush University Medical Center, Chicago, IL 60612, USA
[2] Rush University Medical Center Department of Behavioral Sciences, IL, USA
[3] Rush University Medical Center Department of Medicine, IL, USA

*** Correspondence:** xinqi_dong@rush.edu; Tel: +1-312-942-3350; Fax: +1-312-942-2861.

Abstract: This study examined the socio-demographic and health related characteristics of elder mistreatment (EM) in a community-dwelling older Chinese population. Methods: Guided by a community-based participatory research approach, the PINE study conducted in-person interviews with 3,159 U.S. Chinese older adults aged 60 years and older in the Greater Chicago area from 2011–2013. Participants answered questions regarding psychological, physical and sexual mistreatment, caregiver neglect, and financial exploitation. Definitional approaches for EM subtypes were constructed from least restrictive to most restrictive. Results: The sociodemographic and health-related characteristics associated with EM differed by type of mistreatment and by the operational definition used. Living with fewer people, having been born in countries other than China, poorer health status, and lower quality of life were significantly correlated with physical mistreatment. Only higher education was positively and significantly associated with sexual mistreatment and only poorer health status was consistently correlated with psychological mistreatment among all definitions. Male gender, higher educational levels, higher income, fewer children, and having been in the U.S. for fewer years were significantly correlated with financial exploitation. As for caregiver neglect, older age, having more children, having been in the U.S. for more years, poorer health status, lower quality of life, and worsening health over the past year were consistently correlated with caregiver neglect with different definitions. Conclusions: Prevention and intervention programs on EM should be geared towards specific types of mistreatment. Studies on EM should conduct a thorough analysis to justify the operational definition used.

Keywords: elder mistreatment subtypes; Chinese older adults; socio-demographic characteristics; Community-based participatory research

1. Introduction

Elder mistreatment (EM) is an important health issue that has affected about 10% of U.S. older adults, according to a national representative study in 2010 [1]. The occurrence of EM has been found to be associated with increased risk for decline in physical and cognitive function [2–4], psychological issues, especially depression and loneliness [5–8], morbidity, and mortality [9]. Recently, Dong et al. studied EM among 4,627 community-dwelling older adults in Chicago and found that in addition to the adverse impact on individual health, EM may also lead to a higher risk for hospitalization [10], emergency services utilization [11], as well as increased rates of admission to skilled nursing facilities [12]. Although a recent growing number of studies have reduced the knowledge gap, our understanding of the issue of EM is still in a very rudimentary condition.

EM is often categorized into five types: psychological mistreatment, physical mistreatment, sexual mistreatment, financial exploitation, and caregiver neglect. Different types of EM may be associated with different sociodemographic and health-related characteristics. For example, in a study of 1,245 older adults, a higher prevalence of psychological mistreatment was found among those living alone, whereas a greater percentage of elder neglect was detected in those living with family members [13]. In the South Carolina Elder Mistreatment Study, Amstader et al. examined the correlates of EM subtypes among 902 older adults and found that poor health status was significantly associated with elder neglect but not with physical and financial mistreatment [14]. To more rigorously tackle the issue of EM, we should improve our understanding of the characteristics associated with each type of mistreatment so as to design tailored prevention and intervention programs.

Another issue that frustrates the research progress of EM is the great inconsistency in the operational definitions of EM; this is particularly the case for psychological mistreatment, financial exploitation, and elder caregiver neglect. In reviewing existing literature, many studies have used an "any positive EM item" approach, while others have more systematically considered the heterogeneity of the definitions and have been stricter in the categorization of EM cases [15,16]; such inconsistencies may stem from various methodological considerations and may add to the difficulty and complexity in understanding the issue of EM. Whether a more consistent and unique definition is required has been a steadily growing debate among researchers. Recently, a study examined prevalence of EM subtypes through using different criterion found that the prevalence of EM subtypes differ greatly by the strictness of EM definition [17]. However, we do not know whether the strictness of operational definitions has influences on the correlates of EM and its subtypes.

While studying EM, it is important to take into account cultural differences among various racial/ethnic groups, as previous studies have consistently demonstrated that culture may shape the perception and experience of EM [18,19]. For instance, embracing the value of collectivism that encourages conformity and cohesiveness, Chinese older adults are found to have a tendency to gloss over and tolerate the issue of EM [20]. The 2010 U.S. Census Bureau estimated that the population of Chinese older adults has grown by 55% over the past decade, more than three times faster than the growth rate of the overall U.S. older population [21]. Meanwhile, U.S. Chinese older adults are often with low socio-economic status and limited language proficiency levels [22], and experiencing great

health and cultural disparities [23–27] as well as a wide range of psychological issues [28–34], which may predispose them to a high risk for EM [35]. A recent study on the prevalence of EM revealed that 15.1% of the U.S. Chinese older adults in the greater Chicago area had suffered from some kind of mistreatment [36]. Although the scope of the issue of EM has been identified, sociodemographic and health-related characteristics of EM subtypes in U.S. Chinese aging populations remain unexplored. Insufficient knowledge regarding characteristics of EM subtypes has inhibited the development of treatment and intervention programs in this vulnerable population. There is an urgent need to improve our understanding of EM subtypes in U.S. Chinese older adults.

In this study, we aimed to 1) understand the sociodemographic and health-related characteristics associated with physical mistreatment, psychological mistreatment, sexual mistreatment, financial exploitation, and caregiver neglect; and 2) compare the characteristics of the EM subtypes across different definitions of psychological mistreatment, financial mistreatment, and elder caregiver neglect.

2. Methods

2.1. Population and settings

The Population Study of Chinese Elderly in Chicago (PINE) is a community-engaged, population-based epidemiological study of U.S. Chinese older adults aged 60 and over conducted in the greater Chicago area [37]. Briefly, the purpose of the PINE study was to collect community-level data of U.S. Chinese older adults to examine the key cultural determinants of health and well-being. The project was initiated by a synergistic community-academic collaboration among the Rush Institute for Healthy Aging, Northwestern University, and many community-based social services agencies and organizations throughout the greater Chicago area.

In order to ensure study relevance to the well-being of the Chinese community and increase community participation, the PINE study implemented extensive culturally and linguistically appropriate community recruitment strategies strictly guided by a community-based participatory research (CBPR) approach [38]. The formation of this community-academic partnership allowed us to develop appropriate research methodology in accordance with the local Chinese cultural context [39–41], in which a community advisory board (CAB) plays a pivotal role in providing insights and strategies for conducting research. Board members were community stakeholders and residents enlisted through over twenty civic, health, social and advocacy groups, community centers and clinics in the city and suburbs of Chicago. The board works extensively with an investigative team to develop and examine study instruments to ensure cultural sensitivity and appropriateness.

2.2. Study design and procedure

The research team implemented a targeted community-based recruitment strategy by first engaging community centers as our main recruitment sites throughout the greater Chicago area. Over twenty social services agencies, community centers, health advocacy agencies, faith-based organizations, senior apartments and social clubs served as the basis of study recruitment sites. Community-dwelling older adults who were age 60 years and over and self-identified as Chinese were eligible to participant in the study. Out of 3,542 eligible older adults approached, 3,159 agreed to participate in the study, yielding a response rate of 91.9%. More in-depth details of the PINE study

design are published elsewhere [42].

In order to ensure cultural and linguistic sensitivity, trained multicultural and multi-lingual interviewers conducted face-to-face home interviews with participants in their preferred language and dialects, such as English, Cantonese, Taishanese, Mandarin, or Teochew dialect. Data were collected using state-of-science innovative web-based software which recorded simultaneously in English, Chinese traditional and simplified characters. Based on the available census data drawn from U.S. Census 2010 and a random block census project conducted in the Chinese community in Chicago, the PINE study is representative of the Chinese aging population in the greater Chicago area [43]. The study was approved by the Institutional Review Boards of the Rush University Medical Center.

2.3. Measurements

2.3.1. Sociodemographics

Basic demographic information collected included age, sex, education, annual personal income, marital status, number of children, and living arrangement. Overall health status was measured by the question, "how would you rate your health?" on a four-point scale. Quality of life was assessed by asking participants, "How would you rate your quality of life?" using a four-point scale. Health changes over the last year was measured by the question, "compared to one year ago, how would you rate your health now?" on a three-point scale.

2.3.2. EM subtypes

EM was assessed using a 56-item self-report measure capturing the following EM subtypes: psychological mistreatment, physical mistreatment, sexual mistreatment, caregiver neglect, and financial exploitation. For psychological mistreatment, we used the 8-item modified Conflict Tactic Scale (CTS) [44]. For physical mistreatment, we used 10 items in the CTS. For sexual mistreatment, we used 1 item asking participants if they had been touched in private areas when they did not want to be. Among those who reported any sexual mistreatment, we followed up questions asking the specific sexual mistreatment experience. For caregiver neglect, we used an unmet needs assessment (20-item) [45]. Participants were also asked to evaluate the severity of their own unmet needs (no/mild/moderate/severe). Financial exploitation was measured with a 17-item instrument [46]. (Details of the item are in Table 1).

2.3.3. Definitions of EM subtypes

Five definitions were constructed for psychological mistreatment: 1) an affirmative "yes" response to any of the 8 CTS psychological mistreatment items (Psych-1); 2) two or more items (Psych-2); 3) affirmative responses in three or more items (Psych-3); 4) three or more items or threats for nursing home placement or abandonment (Beach criteria); and 5) ten or more times for CTS items (Pillemer criteria). For physical mistreatment, we only used a single criterion, consisting of any positive response to any of the 10items. For sexual mistreatment, we also used a single criterion, consisting of a positive response to the 1item. For caregiver neglect, we used two different definitions: 1) any unmet needs + living with a family member (neglect-1), and 2) moderate/severe unmet needs +

living with a family member (neglect-2). For financial exploitation, we used two different definitions: 1) any positive answer on the 17-item measure (financial-1), and 2) any positive answer on the 14-item measure, but excluding the items that may be less likely to be considered as financial exploitation: felt entitled to use your money, prevented you from spending your money, and tricked or pressured you into buying something (financial-2).

2.4. Data analysis

Chi-square statistics were used to compare the socio-demographic and health-related characteristics of each type of EM with those who reported no mistreatment experience. For psychological mistreatment, financial exploitation, and elder caregiver neglect, we summarized the demographic, socioeconomic, family composition, immigration, and health-related characteristics of the participants by EM groups according to different restrictiveness levels and definitional criteria. Pearson correlation coefficients and Spearman's rank correlations were calculated to examine the correlations of sociodemographic and health-related factors with each type and each definition criterion of EM subtypes. All statistical analyses were undertaken using SAS, Version 9.2 (SAS Institute Inc., Cary, NC). The significance level for all results was set at $P < 0.05$.

3. Results

3.1. Characteristics associated with psychological mistreatment using different definitions

Of the 3,159 participants, 58.9% were female. Table 1 compared the characteristics of older adults with and without psychological mistreatment experience through using different operational definitions. Compared to the non-mistreatment group, older adults who had experienced psychological mistreatment were more likely to be higher educated, with poor overall health status, with lower quality of life, and with worsening health over the past year, regardless of the operational definition used. However, differences in other socio-demographic characteristics, including age, sex, marital status, number of children, living arrangement, years in the U.S., years in the community, and country of origin, were inconsistent between the mistreatment group and the non-mistreatment group through using various definitions.

3.2. Characteristics associated with physical and sexual mistreatment using different definitions

Characteristics of older adults with and without physical mistreatment and sexual mistreatment were presented in Table 2. Compared with older adults without physical mistreatment, those who had experienced physical mistreatment were more likely to have an annual income of $0–$4,999 (56.2% vs. 33.1%, $P < 0.01$), live alone (39.4% vs. 21.3%, $P < 0.05$), with poor overall health status (39.4% vs. 18.7%, $P < 0.05$), with poor quality of life (15.2% vs.3.0%, $P < 0.01$), and with worsening health status over the past year (51.5% vs. 42.4%, $P < 0.05$). On the other hand, older adults who reported sexual mistreatment were more likely to be women (100.0% vs. 57.9%, $P < 0.05$) and have an educational level of 9 years and over (100.0% vs.51.0%, $P < 0.05$), as compared to those without sexual mistreatment reported.

Table 1. Characteristics associated with psychological mistreatment using different definitions.

	No Psych Mistreat *N* = 2839	Psych_1: 1 or More Items *N* = 308	χ^2 *P*	Psych_2: 2 or More Items *N* = 167	χ^2 *P*	Psych_3: 3 or More Items *N* = 81	χ^2 *P*	Psych_4: Beach Criteria *N* = 91	χ^2 *P*	Psych_5: Pillemer Criteria *N* = 34	χ^2 *P*
Age, *N* (%)											
60–64	619 (21.8)	59 (19.2)		34 (20.4)		16 (19.8)		17 (18.7)		5 (14.7)	
65–69	571 (20.1)	70 (22.7)		35 (21.0)		16 (19.8)		17 (18.7)		6 (17.7)	
70–74	532 (18.7)	71 (23.1)		41 (24.6)		21 (25.9)		23 (25.3)		13 (38.2)	
75–79	491 (17.3)	64 (20.8)	14.3	34 (20.4)	8.9	11 (13.5)	2.9	15 (16.4)	2.6	8 (23.5)	12.4
80 and over	626 (22.1)	44 (14.3)	**0.006**	23 (13.8)	0.06	17 (21.0)	0.56	19 (20.9)	0.63	2 (5.9)	**0.015**
Sex											
Male	1217 (42.9)	106 (34.4)	8.1	58 (34.7)	4.3	30 (37.0)	1.1	33 (36.3)	1.6	10 (29.4)	2.5
Female	1622 (57.1)	202 (65.6)	**0.004**	109 (65.3)	**0.039**	51 (63.0)	0.29	58 (63.7)	0.21	24 (70.6)	0.11
Education (years), *N* (%)											
0–8	1428 (50.5)	105 (34.3)		51 (30.7)		29 (35.8)		33 (36.3)		8 (23.5)	
9–12	839 (29.7)	99 (32.4)	39.5	56 (33.7)	32.2	24 (29.6)	11.9	26 (28.6)	13.9	13 (38.2)	11.4
13 and over	559 (19.8)	102 (33.3)	**0.001**	59 (35.3)	**0.001**	28 (34.6)	**0.003**	32 (35.1)	**0.001**	13 (38.2)	**0.003**
Income (USD), *N* (%)											
$0–$4,999	922 (32.8)	117 (38.5)		68 (41.0)		36 (45.0)		40 (44.4)		18 (52.9)	
$5,000–$9,999	1469 (52.2)	143 (8.9)		77 (46.4)		34 (42.5)		39 (43.3)		12 (35.3)	
$10,000–$14,999	278 (9.9)	32 (10.5)	4.9	16 (9.6)	5.6	7 (8.7)	5.3	8 (9.0)	5.5	3 (8.8)	6.3
$15,000 and over	143 (5.1)	12 (3.9)	0.18	5 (3.0)	0.14	3 (3.8)	0.15	3 (3.3)	0.14	1 (2/9)	0.09
Marital Status, *N* (%)											
Married	2023 (71.7)	209 (68.3)		114 (68.7)		56 (69.1)		60 (65.9)		23 (67.7)	
Separated	46 (1.6)	11 (3.6)		8 (4.8)		5 (6.2)		6 (6.6)		1 (2.9)	
Divorced	63 (2.2)	11 (3.6)	8.5	8 (4.8)	13.9	1 (1.2)	9.7	2 (2.2)	12.6	3 (8.8)	6.9
Widowed	688 (24.4)	75 (24.5)	**0.038**	36 (21.7)	**0.003**	19 (23.5)	**0.021**	23 (25.3)	**0.006**	7 (20.6)	0.07
Number of Children, *N* (%)											
0–1	399 (14.1)	66 (21.5)		39 (23.5)		16 (19.8)		19 (20.9)		9 (26.5)	

2–3	1572 (55.4)	174 (56.7)	17.4	94 (56.6)	15.5	49 (60.5)	5.2	54 (59.3)	6.5	18 (52.9)	4.8
4 and more	865 (30.5)	67 (21.8)	**0.001**	33 (19.9)	**0.001**	16 (19.7)	0.07	18 (19.8)	**0.039**	7 (20.6)	0.09
Living Arrangement, *N* (%)											
Living alone	601 (21.1)	74 (24.0)		48 (28.7)		25 (30.9)		29 (31.9)		11 (32.4)	
1–2	1413 (49.8)	157 (51.0)	2.7	81 (48.5)	6.4	39 (48.1)	5.3	44 (48.3)	7.3	17 (50.0)	3.5
3 or more	824 (29.0)	77 (25.0)	0.26	38 (22.8)	**0.041**	17 (21.0)	0.07	18 (19.8)	**0.025**	6 (17.6)	0.18
Years in the U.S., *N* (%)											
0–9	631 (22.3)	76 (24.8)		47 (28.5)		25 (30.9)		27 (29.7)		6 (17.6)	
10–19	843 (29.8)	92 (30.1)		52 (31.5)		23 (28.4)		27 (29.7)		16 (47.1)	
20–29	745 (26.4)	80 (26.1)	1.6	48 (29.1)	11.5	26 (32.1)	9.7	28 (30.7)	8.4	9 (26.5)	6.2
30 and more	607 (21.5)	58 (19.0)	0.66	18 (10.9)	**0.009**	7 (8.6)	**0.021**	9 (9.9)	**0.039**	3 (8.8)	0.10
Years in the Community, *N* (%)											
0–9	1446 (51.0)	181 (59.3)		109 (66.1)		48 (59.3)		56 (61.5)		16 (47.1)	
10–19	724 (25.6)	63 (20.7)		27 (16.4)		16 (19.7)		18 (19.8)		11 (32.3)	
20–29	424 (15.0)	40 (13.1)	7.7	20 (12.1)	14.6	12 (14.8)	2.6	12 (13.2)	4.2	5 (14.7)	0.9
30 and more	239 (8.4)	21 (6.9)	0.052	9 (5.4)	**0.002**	5 (6.2)	0.46	5 (5.5)	0.25	2 (5.9)	0.81
Country of Origin, *N* (%)											
Mainland China	2649 (93.3)	275 (89.3)		147 (88.0)		71 (87.7)		81 (89.0)		30 (88.2)	
Hong Kong/Macau	86 (3.0)	14 (4.5)		8 (4.8)		4 (4.9)		4 (4.4)		1 (2.9)	
Taiwan	35 (1.2)	7 (2.3)		5 (3.0)		2 (2.5)		4 (4.4)		1 (2.9)	
USA/Canada	10 (0.4)	1 (0.3)	7.5	0 (0)	9.5	0 (0)	5.4	0 (0)	3.9	0 (0)	3.3
Others	59 (2.1)	11 (3.6)	0.11	7 (4.2)	**0.049**	4 (4.9)	0.25	4 (2.2)	0.42	2 (5.9)	0.51
Overall Health Status, *N* (%)											
Very good	330 (4.6)	10 (3.3)		6 (3.6)		4 (4.9)		4 (4.4)		1 (2.9)	
Good	1015 (35.8)	79 (25.6)		42 (25.2)		21 (25.9)		23 (25.2)		6 (17.7)	
Fair	1191 (41.9)	126 (40.9)	32.2	67 (40.1)	20.9	26 (32.1)	20.1	28 (30.8)	28.3	12 (35.3)	16.6
Poor	503 (17.7)	93 (30.2)	**0.001**	52 (31.1)	**0.001**	30 (37.0)	**0.001**	36 (39.6)	**0.001**	15 (44.1)	**0.001**
Quality of Life, *N* (%)											
Very good	188 (6.6)	28 (9.1)		14 (8.4)		6 (7.4)		8 (8.8)		3 (8.8)	
Good	1262 (44.5)	118 (38.3)		62 (37.1)		24 (29.6)		28 (30.8)		13 (38.2)	
Fair	1304 (46.0)	147 (47.7)	8.4	76 (45.5)	20.4	41 (50.6)	26.3	44 (48.3)	27.5	10 (29.4)	47.5

Poor	83 (2.9)	15 (4.9)	**0.038**	15 (9.0)	**0.001**	10 (12.4)	**0.001**	11 (12.1)	**0.001**	8 (23.5)	**0.001**
Health Changes over the Last Year, *N* (%)											
Improved	240 (8.4)	37 (12.1)		27 (16.2)		11 (13.6)		12 (13.2)		7 (20.6)	
Same	1427 (50.3)	106 (34.5)	27.8	47 (28.1)	34.1	25 (30.9)	12.2	27 (29.7)	15.2	8 (23.5)	12.3
Worsened	1171 (41.3)	164 (53.4)	**0.001**	93 (55.7)	**0.001**	45 (55.5)	**0.002**	52 (57.1)	**0.001**	19 (55.9)	**0.002**

Table 2. Characteristics associated with physical and sexual mistreatment using different definitions.

	No Physical Mistreatment (N = 3116)	Physical mistreatment any positive items (N = 33)	χ^2 P	No sexual mistreatment (N = 3114)	Sexual mistreatment: any positive items (N = 6)	χ^2 P
Age, *N* (%)						
60–64	672 (21.6)	7 (21.2)		678 (21.6)	1 (16.7)	
65–69	636 (20.4)	5 (15.2)		638 (20.3)	3 (50.0)	
70–74	595 (19.1)	8 (24.2)		604 (19.2)	1 (16.7)	
75–79	551 (17.7)	5 (15.2)	1.2	555 (17.7)	1 (16.7)	3.9
80 and over	662 (21.2)	8 (24.2)	0.89	668 (21.2)	0 (0)	0.41
Sex, *N* (%)						
Male	1310 (42.0)	13 (39.4)	0.1	1323 (42.1)	0 (0)	4.4
Female	1806 (58.0)	20 (60.6)	0.76	1820 (57.9)	6 (100.0)	**0.037**
Education (years), *N* (%)						
0–8	1524 (49.1)	10 (30.3)		1532 (49.0)	0 (0)	
9–12	923 (29.8)	15 (45.5)	5.2	936 (29.9)	4 (66.7)	6.1
13 and over	654 (21.1)	8 (24.2)	0.07	660 (21.1)	2 (33.3)	**0.048**
Income (USD), *N* (%)						
$0–$4,999	1022 (33.1)	18 (56.2)		1038 (33.3)	2 (40.0)	
$5,000–$9,999	1606 (52.0)	7 (21.9)		1612 (51.8)	2 (40.0)	
$10,000–$14,999	303 (9.8)	7 (21.9)	16.9	310 (10.0)	0 (0)	2.9
$15,000 and over	155 (5.0)	0 (0)	**0.001**	154 (4.9)	1 (20.0)	0.39
Marital Status, *N* (%)						
Married	2208 (71.3)	24 (72.7)		2231 (71.4)	3 (60.0)	
Separated	55 (1.8)	2 (6.1)		57 (1.8)	0 (0)	

Divorced	74 (2.4)	0 (0)	4.2	74 (2.4)	0 (0)	0.8
Widowed	758 (24.5)	7 (21.2)	0.24	761 (24.4)	2 (40.0)	0.85
Number of Children, *N* (%)						
0–1	460 (14.8)	7 (21.2)		466 (14.9)	2 (33.3)	
2–3	1728 (55.5)	17 (51.5)	1.1	1741 (55.5)	3 (50.0)	1.8
4 and more	924 (29.7)	9 (27.3)	0.59	932 (29.7)	1 (16.7)	0.42
Living Arrangement, *N* (%)						
Living alone	663 (21.3)	13 (39.4)		671 (21.4)	3 (50.0)	
1–2	1557 (50.0)	14 (42.2)	6.6	1571 (50.0)	2 (33.3)	2.9
3 or more	895 (28.7)	6 (18.2)	**0.036**	900 (28.6)	1 (16.7)	0.23
Years in the U.S., *N* (%)						
0–9	700 (22.6)	8 (24.2)		706 (22.6)	2 (33.3)	
10–19	925 (29.8)	9 (27.3)		934 (29.9)	1 (16.7)	
20–29	817 (26.4)	9 (27.3)	0.1	824 (26.3)	1 (16.7)	1.3
30 and more	659 (21.2)	7 (21.2)	0.99	664 (21.2)	2 (33.3)	0.73
Years in the Community, *N* (%)						
0–9	1609 (51.8)	19 (57.6)		1625 (51.9)	3 (50.0)	
10–19	783 (25.2)	5 (15.1)		788 (25.1)	1 (16.7)	
20–29	458 (14.7)	6 (18.2)	1.8	464 (14.8)	0 (0)	5.6
30 and more	257 (8.3)	3 (9.1)	0.61	257 (8.2)	2 (33.3)	0.13
Country of Origin, *N* (%)						
Mainland China	2897 (93.0)	27 (81.8)		2918 (92.8)	6 (100)	
Hong Kong/Macau	99 (3.2)	3 (9.1)		102 (3.3)	0 (0)	
Taiwan	41 (1.3)	1 (3.0)		42 (1.3)	0 (0)	
USA/Canada	11 (0.4)	0 (0)	7.0	11 (0.4)	0 (0)	0.5
Others	68 (2.2)	2 (6.1)	0.14	70 (2.2)	0 (0)	0.98
Overall Health Status, *N* (%)						
Very good	139 (4.5)	1 (3.0)		138 (4.4)	1 (16.7)	
Good	1087 (34.9)	8 (24.2)		1093 (34.8)	1 (16.7)	
Fair	1306 (41.9)	11 (33.3)	9.1	1315 (41.8)	3 (50.0)	2.7
Poor	584 (18.7)	13 (39.4)	**0.028**	597 (19.0)	1 (16.7)	0.44
Quality of Life, *N* (%)						
Very good	216 (6.9)	0 (0)		216 (6.9)	0 (0)	
Good	1367 (43.9)	14 (42.4)		1376 (43.8)	6 (100.0)	

Fair	1438 (46.2)	14 (42.4)	17.9	1451 (46.2)	0 (0)	7.7
Poor	93 (3.0)	5 (15.2)	**0.001**	99 (3.1)	0 (0)	0.05
Health Changes Over the Last Year, *N* (%)						
Improved	269 (8.6)	8 (24.2)		276 (8.8)	0 (0)	
Same	1526 (49.0)	8 (24.2)	13.8	1531 (48.7)	2 (40.0)	0.9
Worsened	1319 (42.4)	17 (51.5)	**0.001**	1335 (42.5)	3 (60.0)	0.64

3.3. Characteristics associated with financial exploitation using different definitions

Characteristics associated with financial exploitation are presented in Table 3. Compared with older adults without financial exploitation, those with any financial exploitation experience were more likely to be male, with an education level of 13 years and more, with an annual income of $15,000 and over, with 0 to 1 child, living in the U.S. for 30 or more years, residing in the community for 30 or more years, with poor quality of life, and with worsening health over the past year, regardless of the strictness of the definitions.

Table 3. Characteristics associated with financial exploitation using different definitions.

	No financial exploitation *N* = 2855	Financial exploitation: any positive items *N* = 291	χ^2 *P*	Financial exploitation: more strict definition *N* = 277	χ^2 *P*
Age, *N* (%)					
60–64	630 (22.1)	48 (16.5)		45 (16.2)	
65–69	570 (20.0)	69 (23.7)		65 (23.5)	
70–74	537 (18.8)	66 (18.2)		64 (23.1)	
75–79	503 (17.6)	53 (18.2)	8.6	48 (17.3)	8.3
80 and over	615 (21.5)	55 (18.9)	0.07	55 (19.9)	0.08
Sex					
Male	1168 (40.9)	154 (52.9)	15.6	147 (53.1)	15.3
Female	1687 (59.1)	137 (47.1)	**0.001**	130 (46.9)	**0.001**
Education (years), *N* (%)					
0–8	1445 (50.9)	87 (29.9)		79 (28.5)	
9–12	838 (29.5)	101 (34.7)	57.2	98 (35.4)	61.1
13 and over	558 (19.6)	103 (35.4)	**0.001**	100 (36.1)	**0.001**

Income (USD), *N* (%)					
$0–$4,999	943 (33.4)	95 (32.9)		87 (31.6)	
$5,000–$9,999	1483 (52.4)	131 (45.3)		127 (46.2)	
$10,000–$14,999	270 (9.5)	40 (13.8)	13.1	39 (14.2)	13.1
$15,000 and over	132 (4.7)	23 (8.0)	**0.004**	22 (8.0)	**0.004**
Marital Status, *N* (%)					
Married	2023 (71.3)	207 (72.1)		196 (71.8)	
Separated	49 (1.7)	8 (2.8)		8 (2.9)	
Divorced	66 (2.3)	8 (2.8)	2.5	8 (2.9)	2.9
Widowed	701 (24.7)	64 (22.3)	0.48	61 (22.3)	0.40
Number of Children, *N* (%)					
0–1	403 (14.1)	63 (21.7)		59 (21.4)	
2–3	1579 (55.4)	164 (56.6)	17.1	158 (57.2)	16.2
4and more	870 (30.5)	63 (21.7)	**0.001**	59 (21.4)	**0.001**
Living Arrangement, *N* (%)					
Living alone	606 (21.2)	69 (23.7)		67 (24.2)	
1–2	1417 (49.7)	152 (52.2)	3.4	143 (51.6)	3.4
3 or more	831 (29.1)	70 (24.1)	0.18	67 (24.2)	0.19
Years in the U.S., *N* (%)					
0–9	643 (22.6)	64 (22.2)		58 (21.1)	
10–19	866 (30.5)	70 (24.2)		67 (24.4)	
20–29	753 (26.5)	70 (24.2)	13.9	67 (24.4)	15.1
30 and more	580 (20.4)	85 (29.4)	**0.003**	83 (30.2)	**0.002**
Years in the Community, *N* (%)					
0–9	1468 (51.5)	158 (54.9)		147 (53.7)	
10–19	732 (25.7)	56 (19.4)		54 (19.7)	
20–29	422 (14.8)	41 (14.2)	8.6	41 (14.9)	8.0
30 and more	226 (7.9)	33 (11.5)	**0.035**	32 (11.7)	**0.046**
Country of Origin, *N* (%)					
Mainland China	2659 (93.1)	262 (90.0)		248 (89.5)	
Hong Kong/Macau	89 (3.1)	13 (4.5)		13 (4.7)	
Taiwan	34 (1.2)	8 (2.7)		8 (2.9)	
USA/Canada	9 (0.3)	2 (0.7)	7.6	2 (0.7)	8.9
Others	64 (2.2)	6 (2.1)	0.11	6 (2.2)	0.06

Overall Health Status, *N* (%)					
Very good	123 (4.3)	16 (5.5)		16 (5.8)	
Good	1009 (35.3)	86 (29.5)		82 (29.6)	
Fair	1191 (41.7)	123 (42.3)	5.7	117 (42.2)	5.5
Poor	532 (18.6)	66 (22.7)	0.13	62 (22.4)	0.14
Quality of Life, *N* (%)					
Very good	185 (6.5)	31 (10.6)		28 (10.1)	
Good	1253 (43.9)	125 (43.0)		121 (43.7)	
Fair	1332 (46.7)	120 (41.2)	12.7	113 (40.8)	11.8
Poor	83 (2.9)	15 (5.2)	**0.005**	15 (5.4)	**0.008**
Health Changes over the Last Year, *N* (%)					
Improved	246 (8.6)	31 (10.6)		29 (10.5)	
Same	1412 (49.5)	121 (41.6)	6.8	114 (41.2)	7.1
Worsened	1196 (41.9)	139 (47.8)	**0.034**	134 (48.4)	**0.029**

3.4. Characteristics associated with caregiver neglect using different definitions

Compared to older adults who had not experienced caregiver neglect, those who reported any neglect were more likely to be with older age, with more children, living with one or more people, with poor health status, with poor quality of life, and with worsening health changes over the past year **(Table 4).** However, differences with regard to education levels, income, and marital status between the neglect and the non-neglect group were significant only when using the less restrictive operational definition.

Table 4. Characteristics associated with caregiver neglect using different definitions.

	No caregiver neglect *N* = 2834	Caregiver neglect: any positive items *N* = 331	χ^2 *P*	Caregiver neglect: more strict definition *N* = 136	χ^2 *P*
Age, *N* (%)					
60–64	656 (23.1)	37 (11.2)		15 (11.0)	
65–69	609 (21.5)	55 (16.6)		16 (11.8)	
70–74	547 (19.3)	67 (20.2)		29 (21.3)	
75–79	491 (17.3)	67 (20.2)	55.5	29 (21.3)	32.4
80 and over	531 (18.7)	105 (31.7)	**0.001**	47 (34.6)	**0.001**
Sex					
Male	1204 (42.5)	145 (43.8)	0.2	63 (46.3)	0.8

Female	1630 (57.5)	186 (56.2)	0.65	73 (53.7)	0.38
Education (years), *N* (%)					
0–8	1344 (47.6)	185 (56.4)		70 (52.6)	
9–12	868 (30.8)	92 (28.1)	12.6	37 (27.8)	1.3
13 and over	611 (21.6)	51 (22.3)	**0.002**	26 (19.6)	0.53
Income (USD), *N* (%)					
$0–$4,999	963 (34.3)	98 (29.9)		35 (26.3)	
$5,000–$9,999	1410 (50.2)	194 (59.2)		79 (59.4)	
$10,000–$14,999	291 (10.3)	26 (7.9)	12.4	12 (9.0)	4.7
$15,000 and over	146 (5.2)	10 (3.0)	**0.006**	7 (5.3)	0.19
Marital Status, *N* (%)					
Married	2032 (72.2)	260 (78.8)		105 (77.8)	
Separated	53 (1.9)	3 (0.9)		2 (1.5)	
Divorced	70 (2.5)	5 (1.5)	8.3	2 (1.5)	2.2
Widowed	659 (23.4)	62 (18.8)	**0.039**	26 (19.2)	0.54
Number of Children, *N* (%)					
0–1	429 (15.2)	33 (10.0)		19 (14.2)	
2–3	1610 (56.9)	161 (48.9)	29.2	55 (41.0)	18.4
4 and more	792 (27.9)	135 (41.0)	**0.001**	60 (44.8)	**0.001**
Living Arrangement, *N* (%)					
Living alone	621 (21.9)	0 (0)		0 (0)	
1–2	1400 (49.4)	220 (66.5)	100.2	94 (69.1)	40.0
3 or more	812 (28.7)	111 (33.5)	**0.001**	42 (30.9)	**0.001**
Years in the U.S., *N* (%)					
0–9	673 (23.8)	54 (16.4)		17 (12.7)	
10–19	845 (29.9)	100 (30.4)		41 (30.6)	
20–29	719 (25.4)	108 (32.8)	14.8	44 (32.8)	10.1
30 and more	590 (20.9)	67 (20.4)	**0.002**	32 (23.9)	**0.018**
Years in the Community, *N* (%)					
0–9	1487 (52.6)	157 (47.6)		70 (51.9)	
10–19	703 (24.9)	92 (27.9)		32 (23.7)	
20–29	408 (14.4)	52 (15.8)	3.8	20 (14.8)	0.5
30 and more	229 (8.1)	29 (8.8)	0.29	13 (9.6)	0.93
Country of Origin, *N* (%)					

Mainland China	2631 (92.8)	313 (94.6)		128 (94.1)	
Hong Kong/Macau	91 (3.2)	13 (3.9)		6 (4.4)	
Taiwan	40 (1.4)	1 (0.3)		2 (1.5)	
USA/Canada	11 (0.4)	1 (0.3)	6.3	0(0)	3.3
Others	61 (2.2)	3 (0.9)	0.18	2 (1.5)	0.50
Overall Health Status, *N* (%)					
Very good	133 (4.7)	2 (0.6)		1 (0.7)	
Good	1043 (36.8)	67 (20.2)		18 (13.2)	
Fair	1186 (41.8)	151 (45.6)	92.6	67 (49.3)	56.2
Poor	472 (16.7)	111 (33.5)	**0.001**	50 (36.8)	**0.001**
Quality of Life, *N* (%)					
Very good	199 (7.0)	13 (3.9)		8 (5.9)	
Good	1267 (44.7)	103 (31.1)		40 (29.4)	
Fair	1287 (45.3)	203 (61.3)	38.5	79 (58.1)	17.9
Poor	80 (2.8)	12 (3.6)	**0.001**	9 (6.6)	**0.001**
Health Changes over the Last Year, *N* (%)					
Improved	253 (8.9)	25 (7.5)		9 (6.6)	
Same	1432 (50.6)	136 (41.1)	15.1	44 (32.4)	22.6
Worsened	1147 (40.5)	170 (51.4)	**0.001**	83 (61.0)	**0.001**

3.5. Correlations between socio-demographic characteristics with specific subtypes of elder mistreatment in a Chinese population

The correlation of socio-demographic and health-related characteristics with selected types of EM ispresented in Table 5.

Living with fewer people ($r = 0.04$, $P < 0.05$), having been born in countries other than China ($r = 0.04$, $P < 0.05$), poorer health status ($r = 0.04$, $P < 0.05$), and lower quality of life ($r = 0.04$, $P < 0.05$) were significantly correlated with physical mistreatment. Among different characteristics, only higher education ($r = 0.04$, $P < 0.05$) was positively and significantly associated with sexual mistreatment.

The correlation between sociodemographic and health-related characteristics with psychological mistreatment varied with the definition used. Only poorer health status was consistently correlated with psychological mistreatment using all definitions. Being male, higher educational levels, higher income, less children, and having been in the U.S. for fewer years were significantly correlated with financial exploitation. As for caregiver neglect, older age, having been in the U.S. for more years, having more children, poorer health status, lower quality of life, and worsening health over the past year were consistently correlated with caregiver neglect with different definitions. However, lower education ($r = 0.08$, $P < 0.001$), being married ($r = 0.05$, $P < 0.01$), and living with more people ($r = 0.07$, $P < 0.001$) were only correlated with caregiver neglect with the less restrictive definition.

Table 5. Correlations between sociodemographic characteristics with specific subtypes of elder mistreatment in a Chinese population.

	Age	Gender	Education	Income	Marital Status	Number of Children	Living Arrange	Yrs In-US	Yrs in Neigh-hood	Country of Origin	Overall Health Status	Quality of Life	Change Health
Age	1.0												
Gender	0.01	1.0											
Education	-0.12+	-0.20+	1.0										
Income	-0.05#	0.01	0.13+	1.0									
Married	-0.33+	-0.34+	0.22+	-0.03	1.0								
# of Children	0.33+	0.08+	-0.38+	-0.07+	-0.13+	1.0							
Living Arrange	-0.29+	-0.07+	-0.04*	-0.10+	0.24+	-0.03	1.0						
Yr-in US	0.35+	0.03	-0.07+	0.32+	-0.20+	0.12+	-0.28+	1.0					
Yr-in Neighborhood	0.25+	0.02	-0.08+	0.21+	-0.13+	0.07+	-0.18+	0.68+	1.0				
Born China	0.05#	-0.02	-0.08+	-0.20+	0.04*	0.04*	0.04*	-0.21+	-0.15+	1.0			
Health Status	-0.08+	-0.06+	0.06+	0.12+	0.04+	-0.01	0.01	0.01	0.05+	-0.04*	1.0		
QOL	0.06+	0.06+	0.09+	0.08+	-0.03	0.04*	-0.01	0.02	-0.01	-0.04*	0.33+	1.0	
Change in Health	-0.11+	-0.03	0.02	0.05#	0.07+	-0.04*	0.01	0.02	0.04*	0.01	0.34+	0.16+	1.0
Physical	0.01	0.01	0.03	-0.03	0.01	-0.01	-0.04*	-0.01	-0.01	-0.04*	-0.04*	-0.04*	-0.01
Sexual	-0.02	-0.02	0.04*	0.01	-0.02	-0.02	-0.02	-0.01	0.01	0.01	0.01	0.03	-0.02
Psych_1	-0.02	0.05#	0.11+	-0.02	-0.02	-0.07+	-0.03	-0.02	-0.05#	-0.05#	-0.09+	-0.01	-0.05#
Psych_2	-0.02	0.04*	0.09+	-0.02	-0.01	-0.06+	-0.03	-0.06	-0.06+	-0.05*	-0.07+	-0.03	-0.03
Psych_3	-0.01	0.02	0.05#	-0.02	-0.01	-0.04*	-0.04*	-0.04*	-0.02	-0.03	-0.05#	-0.05#	-0.03
Psych_Beach	0.01	0.02	0.05#	-0.02	-0.02	-0.04*	-0.04*	-0.04*	-0.03	-0.03	-0.06+	-0.05#	-0.04*
Psych_Pillemer	-0.01	0.03	0.07+	-0.03	-0.01	-0.05#	-0.02	-0.02	-0.01	-0.03	-0.06+	-0.03	-0.03
Financial_1	-0.01	-0.07+	0.13+	0.05#	0.01	-0.07+	-0.03	0.06#	0.01	-0.03	-0.03	0.02	-0.01
Financial_2	0.01	-0.07+	0.14+	0.05#	-0.01	-0.07+	-0.03	0.06+	0.02	-0.04	-0.02	0.02	-0.01
Neglect_1	0.14+	-0.01	-0.08+	-0.03	0.05#	0.13+	0.07+	0.05#	0.03	0.02	-0.17+	-0.10+	-0.08+
Neglect_2	0.10+	-0.02	-0.03	0.01	0.03	0.07+	0.02	0.06+	0.01	0.01	-0.13+	-0.07+	-0.10+

4. Discussion

This study examined the characteristics associated with the subtypes of mistreatment among Chinese older adults in the greater Chicago area. The findings suggest that the socio-demographic and health-related characteristics varied with the type of mistreatment and the operational definition used to measure the mistreatment. As the largest study of EM among U.S. Chinese older adults, it expands our existing knowledge of EM and important empirical evidence with respect to the correlates of EM subtypes, facilitating the design of EM prevention and intervention programs.

To the best of our knowledge, this study was the first study that intended to analyze the characteristics associated with EM subtypes using different operational definitions in the same population cohort. The research of EM is impeded and complicated by a lack of consensus in the definitions. Although researchers have called on a more unifying research framework to understand the issue, it is never an easy task to reach agreement, especially when it comes to operational definitions. This study suggests that sociodemographic and health-related correlates of EM and its subtypes in the same population cohort maybe inconsistent when using definitions of different strictness For example, when using the less restrictive definition, educational levels, marital status, and living arrangement were significantly correlated with caregiver neglect, but these significant correlations were not observed when using the strict definition. Likewise, being female was significantly correlated with psychological mistreatment of the least strict definition (psy_1 and psy_2), but the correlation was not found when using more restrict definition (psy_3, psy_Beach, Psy_Pillemer). Achieving a clear and standardized definition is important, as it could better guide researchers and physicians to identify older adults who are at risk for specific types of mistreatment as well as to design and develop effective interventions and treatments for EM. It will also help researchers and policy makers to better estimate the scope and cost of EM.

In this study, living with fewer people was correlated with increased physical mistreatment. Prior studies on physical mistreatment and living arrangement have yielded inconsistent findings. Most of the studies have suggested a significant positive association between shared living arrangement and EM [47,48]. However, a study among 2,000 older adults in mainland China found that older adults living alone were more likely to be mistreated [49]. We suspect that in our study, older adults living alone without the safeguard from active family members or friends may increase the opportunity for mistreatment. In addition, similar to what has been postulated in other Chinese populations [49], living alone may be a decision that was either forced by the perpetrator or chosen by the older adults themselves because of the occurrence of physical mistreatment.

Interestingly, among the characteristics, only higher education was positively and significantly correlated with sexual mistreatment. This is in contrast to other studies showing that lower educational levels were associated with sexual mistreatment [50,51]. It is likely that adults with higher education were more socially engaged with others, increasing their chances of exposure to sexual mistreatment. It is also possible that adults with higher educational levels have greater awareness of sexual mistreatment, and therefore are less likely to tolerate the issues, leading to a greater disclosure rate. Additionally, sex is a typical taboo topic in Chinese culture and an open discussion of sexual issues is often discouraged [52]. Since less educated older adults are perhaps less acculturated and more attached to their culture of origin, we suspect that cultural reluctance to report shameful sexual experience may lead to a lower endorsement of sexual mistreatment among this group [52].

Another unexpected finding was that income was not a significant correlate of EM subtypes except financial exploitation. Higher income was correlated with increased risk for financial exploitation, which is inconsistent with findings of studies in other aging populations. For example, in a study of the prevalence and characteristics of EM subtypes among 2,039 older adults in mainland China, living source, including personal income, was not associated with financial exploitation [49]. In the U.S. National Elder Mistreatment Study of 5,777 older adults, income was also not significantly associated with financial exploitation [1]. In our study, it is possible that older adults with higher income levels have more disposable income and are more involved in financing or investing activities, increasing their risk for financial exploitation.

In this study, having been in the U.S. for longer periods of time was significantly correlated with increased elder caregiver neglect. This is consistent with another study in Latino older adults, which found that years in the U.S. was positively associated with elder caregiver neglect [53]. We suspect that compared to newer immigrants, older immigrants are more culturally-adapted and are more likely to be independent. Yet this kind of individualism, in turn, may decrease the levels of contact with adult children and reduce the likelihood of being taken care of while getting older. It is also the case that adult children of older immigrants tend to acquire better English proficiency; they may live far away from the older parents for their out-of-state or out-of-country decent jobs and may fair to care for their older parents, despite the need. Although this postulate cannot be supported directly by the data, it was frequently observed in the field survey. However, having been in the U.S. for longer periods of time was negatively correlated with financial exploitation. This may be because that older adults who lived in the U.S. longer may have a better knowledge with respect to how to protect their financial properties. On the contrary, older adults who have been in the U.S. for a shorter period of time, especially those newcomers, may be less aware about the resources and services that could perhaps protect them from financial exploitation, given their limited English language proficiency.

Lower health status was correlated with increased risk for psychological mistreatment, regardless of the strictness of the definitions used. However, this study was unable to determine the direction of the relationship between health status and psychological mistreatment. Poorer health status may increase the needs of care from family members or person in a trusted relationship with the older adults, and thus lead to increased caregiver burden and psychological mistreatment. On the other hand, psychological mistreatment may adversely impact heath status through adding more distress to the older adult.

The study findings should be interpreted while considering the following limitations. First, this study only captured a select set of definitions in the literature. There may be other definitions that have not yet been captured. Second, this study was designed as a descriptive study and we did not conduct multivariate analysis to examine the association between sociodemographic and health-related characteristics and EM subtypes. Future studies should conduct more rigorous analysis to better understand correlates of EM subtypes. In addition, we did not collect qualitative data to gain a deep understanding of the social and cultural context of EM. Finally, this study utilized a cross-sectional design; future longitudinal studies are needed to enhance our understanding of the causal relations between sociodemographic and health-related characteristics and EM.

Notwithstanding the limitations, this study has important research and policy implications. First, characteristics correlated with EM varied across subtype of mistreatment, emphasizing the need to consider the subtypes of mistreatment separately. In addition, this study found that the characteristics with EM differed by the operational definition used, suggesting a need of a thorough analysis of the definition used while conducting research on EM. Furthermore, the sociodemographic and health related characteristics of the subtype of EM identified in this study indicate that the design of prevention and intervention programs should gear toward specific populations such as Chinese older adults who live alone or with poor health status.

The study also has important implications for individuals and community organizations. Community social services play important roles in addressing the issues of EM in minority populations. Given that different types of EM may be correlated with different sociodemographic and health-related characteristics, community services should consider such differences and allocate resources into services related to EM subtypes differently. For example, educational programs about financial exploitation should be promoted to older adults who are new to the U.S. as well as older adults with higher income. However, community workers who work on caregiver neglect issues may need to focus on those living in the U.S. for a longer period of time. At the individual level, family members and elderly individuals should improve knowledge of different types of mistreatment. Family members caring for older adults with low health status may need to improve their coping strategies so as to minimize their risk of engaging in psychological mistreatment.

5. Conclusion

In conclusion, this study suggests that socio-demographic and health-related characteristics of EM varied with the subtype of mistreatment and the operational definition used. Living with fewer people, having been born in countries other than China, poorer health status, and poorer quality of life were significantly correlated with physical mistreatment. Among different characteristics, only higher education was positively and significantly associated with sexual mistreatment. Poorer health status was consistently correlated with psychological mistreatment by using different definitions. Male gender, higher educational levels, higher income, less number of children, and having been in

the U.S. for fewer years were significantly correlated with financial exploitation. As for caregiver neglect, older age, having more children, having been in the U.S. for more years, poorer health status, lower quality of life, and worsening health over the past year were consistently correlated with caregiver neglect using both definitions. These findings are among the first to characterize these relationships in a U.S. Chinese population and provide important targets for EM prevention and intervention efforts.

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Conflict of Interest

Authors report no conflict of interest.

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