

# Variations in Dementia Awareness, Contact and Stigma Attitudes Across Generations: A Community-Based Cross-Sectional Study in Shanghai, China

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**Background:** Against the backdrop of population aging and the accelerated development of dementia-friendly communities, public stigmatizing attitudes toward dementia have emerged as a critical barrier to the social integration of affected individuals. To date, limited empirical research in China has examined the mechanisms linking dementia knowledge, contact, and stigmatizing attitudes (perceived stigma) across different age groups within indigenous community settings. This study, conducted as part of a pilot dementia-friendly community initiative in Shanghai, seeks to investigate intergenerational differences in dementia knowledge, contact experiences, and stigmatizing attitudes, and to examine the mediating role of contact in the relationship between knowledge and stigma, thereby contributing locally grounded empirical evidence to the field.

**Methods:** A cross-sectional survey design was employed. A total of 397 community-dwelling residents aged 18 years and older in Shanghai participated in the study. Data were collected on sociodemographic characteristics, dementia knowledge, contact experiences with individuals living with dementia, and stigmatizing attitudes. Descriptive statistics and between-group analyses were used to compare age-group differences, and a mediation model was constructed to test the associations among dementia knowledge, contact, and stigma.

**Results:** Significant intergenerational differences were observed in dementia knowledge, contact experiences, and stigmatizing attitudes. Middle-aged adults demonstrated higher levels of knowledge and more positive contact intentions; older adults reported the highest frequency of contact and the lowest levels of stigma; and younger adults exhibited the most pronounced stigmatizing attitudes. Mediation analysis further revealed that contact experience partially mediated the relationship between dementia knowledge and stigmatizing attitudes, suggesting that higher levels of dementia knowledge may be associated with reduced stigma through the facilitation of positive contact.

**Conclusion:** Enhancing public knowledge of dementia and promoting positive contact with affected individuals may contribute to reducing social stigma and supporting the social inclusion of people living with dementia. This study further elucidates the pathway linking dementia knowledge and stigmatizing attitudes, identifying contact behavior as a significant mediator. The findings lend support to intervention strategies that integrate cognitive enhancement with structured contact initiatives, and provide preliminary evidence for age-specific community-based anti-stigma practices. It should be noted that the mediation pathway identified in this study is correlational rather than causal; moreover, as the sample was drawn from pilot dementia-friendly communities in Shanghai, the generalizability of the findings to other communities or regions may be constrained by variations in local support systems, public awareness, and aging profiles. Future research should adopt longitudinal or interventional designs to validate these findings across broader populations.

**Keywords:** dementia, stigma, public attitudes, dementia knowledge, intergenerational difference

## Introduction

Dementia is a syndrome of progressive cognitive impairment resulting from brain injury or organic pathology, characterized clinically by the continuous decline in multiple domains, including memory, executive function, language ability, and visuospatial skills. Alzheimer's disease is its most common subtype, accounting for approximately 60–70% of all cases.<sup>1</sup> According to a joint report released in 2022 by Alzheimer's Disease International (ADI) and the World Health Organization (WHO), the global number of people living with dementia has exceeded 55 million, with nearly 10 million new cases occurring annually. This figure is projected to reach 78 million by 2030.<sup>2</sup> Estimates from the China Association of Gerontology and Geriatrics indicate that the prevalence of mild cognitive impairment in China is approximately 15.5%, affecting about 38.77 million individuals. The current number of moderate-to-severe dementia cases is estimated at 15.07 million, and this total is expected to rise to 22.20 million by 2030.<sup>3</sup> This disease not only imposes sustained pressure on public health systems and long-term care resources both globally and in China but also places substantial economic and psychological burdens on affected families.

To address this challenge, building inclusive and supportive “dementia-friendly communities” has emerged as a key strategy advocated by the international community. This approach aims to support individuals with dementia in maintaining social participation and independent living to the greatest extent possible by optimizing physical and social environments and enhancing community members' knowledge and coping capacities.<sup>4</sup> However, stigma deeply embedded in sociocultural contexts critically impedes this process. Stigma is conceptualized as a profound process of social devaluation encompassing labeling, stereotyping, separation, status loss, and discrimination, which subjects stigmatized groups to unfair treatment and social exclusion.<sup>5</sup> Within the context of dementia, the public often employs stigmatizing labels such as “senile” or “mentally deficient” due to limited knowledge—a phenomenon that not only reflects misconceptions about the disease but also directly perpetuates discriminatory behavior. The ADI 2019 report indicated that approximately 35–57% of individuals with dementia worldwide have experienced exclusion or isolation in social interactions,<sup>6</sup> and nearly 20% deliberately conceal their diagnosis due to fear of discrimination, severely delaying diagnosis and intervention. Prevailing public stereotypes—such as the perception that affected individuals are “incompetent” or exhibit “strange and frightening” behavior—result in frequent misunderstanding, avoidance, and discrimination in daily life, thereby compromising social integration, psychological well-being, and willingness to seek help.<sup>7</sup>

Thus, understanding the mechanisms underlying public stigmatizing attitudes is essential for designing effective anti-stigma interventions. Traditional health belief models typically conceptualize knowledge, attitudes, and behavior as linearly related; however, a growing body of scholarship suggests that dementia knowledge, contact experiences, and stigma are subject to more complex and dynamic interactions.<sup>8</sup> To date, research examining the interrelationships among knowledge, contact, and stigmatizing attitudes has been conducted across diverse national contexts—including the United States,<sup>9</sup> Israel,<sup>10</sup> Australia,<sup>11</sup> South Korea,<sup>12</sup> Saudi Arabia,<sup>13</sup> India,<sup>14</sup> the United Kingdom,<sup>15</sup> and China<sup>16,17</sup>—yielding a substantial body of findings. Existing studies have demonstrated that public attitudes are shaped by socio-demographic characteristics such as age,<sup>10</sup> educational level,<sup>18</sup> level of awareness,<sup>19</sup> and personal interactions with those affected by dementia. Nevertheless, several limitations persist. First, most studies have focused on Western societies or specific populations such as healthcare professionals and students, while in-depth analyses targeting general community-dwelling residents in China remain relatively scarce—despite the critical influence of cultural background and social structure on stigma. Second, much of the extant literature treats knowledge, contact, and attitudes as parallel independent variables, exploring only simple correlations or between-group differences,<sup>20,21</sup> without sufficiently elucidating the dynamic, systemic pathways and mechanisms through which these three factors interact. Even when studies acknowledge the importance of interactive effects, empirical investigations—whether quantitative or qualitative—that rigorously test such associations are exceedingly rare.

To address this research gap and to systematically examine the determinants and pathways underlying public stigmatizing attitudes within the context of China's dementia-friendly communities, the present study posits the following: Public knowledge of dementia, contact experiences with affected individuals, and stigmatizing attitudes are not isolated variables, but rather constitute a tightly coupled, reciprocally interacting triadic system. This proposition is grounded in robust theoretical and empirical foundations.

First, from a theoretical standpoint, classical attitude structure theory posits that attitudes are constituted by the dynamic interplay of three components—cognitive (knowledge, beliefs), affective (emotional responses), and behavioral predispositions. In social psychology, intergroup contact theory emphasizes that, under appropriate conditions such as equal status, common goals, cooperation, and institutional support, positive contact with out-group members can effectively enhance understanding, reduce anxiety, and dismantle stereotypes, thereby improving intergroup attitudes.<sup>20,21</sup> This directly illuminates the dual role of contact as a key variable in shaping both cognition (by facilitating understanding) and affective attitudes (by reducing prejudice). Furthermore, within the field of health stigma research, Link and Phelan's theoretical framework conceptualizes the stigmatization process as a dynamic socio-cognitive chain. In this framework, public stereotypes about affected individuals (distorted cognitive representations) constitute the starting point of stigmatization and directly precipitate discriminatory behaviors (avoidant contact). Thus, cognition serves as a precondition for both the willingness to engage in contact and the quality of such contact, while negative contact expectations or experiences reciprocally reinforce cognitive biases and affective rejection, collectively engendering and perpetuating stigma.

Second, a substantial body of dementia-specific empirical evidence corroborates these interactive pathways. Multiple studies have demonstrated that higher levels of dementia knowledge are significantly associated with lower levels of stigma.<sup>22</sup> More importantly, research has confirmed that contact plays a pivotal mediating or moderating role in this association. For instance, an Australian study found that community members who had direct, positive contact experiences with individuals with dementia not only exhibited higher knowledge levels but also reported significantly lower stigma compared to those lacking such contact.<sup>23</sup> A community-based study in China employing path analysis revealed that dementia knowledge not only directly and negatively predicted stigma but also indirectly reduced stigma by enhancing the willingness to engage in positive contact with affected individuals.<sup>17</sup> Collectively, these studies provide convergent support for the “knowledge → contact → stigma” pathway as an empirically grounded mechanism.

To recapitulate, the formation of stigmatizing attitudes is not attributable to any single factor, but rather reflects the outcome of complex, systemic interactions among cognition, affect, and lived experience at both individual and societal levels. Cognitive biases—such as the belief that dementia is “uncontrollable”—directly engender negative emotions (eg, fear, avoidance) and suppress the willingness to engage in egalitarian contact; conversely, the absence of contact or negative contact experiences reciprocally reinforce erroneous cognitions and heighten affective rejection, thereby jointly generating and sustaining stigmatizing attitudes. Accordingly, drawing upon an integrated theoretical framework combining intergroup contact and stigma theories, this study situates knowledge, contact, and stigmatizing attitudes within a dynamic, interactive analytical model. Selecting Shanghai—a municipality with advanced population aging and active implementation of dementia-friendly community pilots—as the research setting, this study employs a cross-sectional quantitative design to assess the current status and intergenerational differences (young, middle-aged, and older adults) in the three core variables and to further investigate the pathways linking dementia knowledge, contact experiences, and stigmatizing attitudes among community residents. Specifically, this study examines whether contact experience serves as a key mediator in the pathway through which knowledge influences stigmatizing attitudes, and tests the theorized “knowledge–contact–stigma” pathway using mediation models. The anticipated findings are expected to provide deeper insight into the underlying logic of stigma generation and maintenance within community contexts, offer precise theoretical guidance for designing multi-target, synergistic intervention strategies (eg, integrating knowledge education with facilitated contact), and furnish localized empirical evidence and strategic implications for advancing dementia-friendly community initiatives and formulating scientifically robust, effective public education and anti-stigma social actions in China.

## Materials and Methods

### Data Acquisition

This study employed a cross-sectional survey design conducted from March 1 to May 7, 2024, targeting permanent residents in pilot dementia-friendly community areas in Shanghai. A mixed-method recruitment strategy combining online and offline approaches was adopted: online recruitment utilized the “Questionnaire Star” platform, with anonymous self-administered questionnaires distributed via social media channels such as WeChat; offline recruitment involved simultaneous random distribution of paper-based questionnaires to enhance the systematic nature and coverage

of data collection. A total of 554 questionnaires were collected. Given this study's focus on the core variable of "contact experience", it was necessary to ensure that respondents possessed a certain baseline of contact with individuals living with dementia. Therefore, 105 samples reporting "no contact experience with dementia" were excluded, retaining 449 questionnaires. After rigorous screening for data completeness and response validity, 397 valid questionnaires were ultimately obtained, yielding an effective response rate of 88.4%.

To ensure sample representativeness and data quality, the following inclusion criteria were established: (1) age  $\geq 18$  years, to encompass different generational cohorts; (2) experience in dementia care or interpersonal contact with affected individuals, to ensure a relevant experiential foundation; (3) workers engaged in community-based elderly services or dementia-friendly community initiatives, possessing professional knowledge related to dementia-friendly community development; (4) other community residents and members of the general public, to incorporate a broader, more heterogeneous social spectrum. In accordance with the research objectives, and with reference to the World Health Organization (WHO) age classification standards and China's national conditions, respondents were divided into three age groups: young adult group (18–44 years), middle-aged group (45–59 years), and older adult group (60 years and above). This classification approach balances international standards, local contextual considerations, and the feasibility of intergenerational comparisons within community settings.<sup>24</sup>

### Ethical Approval

This study was conducted in strict accordance with the ethical principles of the Declaration of Helsinki and received approval from the Ethics Committee of the institution to which the researchers belong. All participants provided informed consent prior to the survey, and anonymity and data confidentiality were ensured throughout the research process.

### Demographic Data

This study comprehensively surveyed three distinct age groups in the general population: young, middle-aged, and older adults. The survey included an assessment of awareness about dementia, the extent of intimate contact with those affected by dementia, and attitudes towards stigma associated with dementia (See [Appendix 1, Part 1](#) for the questionnaire). A wide range of demographic information was collected, including sex, age, occupation, education level, monthly per capita income, and previous experiences interacting with those affected by dementia.

### Dementia Awareness

This study was conducted in response to a public survey on dementia awareness. It used the 16-item Chinese Dementia Awareness Assessment Scale (DKAS-TC) to assess participants' dementia awareness,<sup>25</sup> which was modified to include 15 questions covering four dimensions: causes and characteristics, communication and behaviours, caregiving considerations, and risk and health promotion (See [Appendix 1, Part 2](#) for the questionnaire). The participants in this study responded to the question items using a seven-point Likert scale, where 1 represented "Strongly Disagree", 2 represented "Disagree", 3 represented "Comparatively Disagree", 4 represented "Neutral", 5 represented "Comparatively Agree", 6 represented "Agree", and 7 represented "Strongly Agree". Their scores were determined by assigning 0 to Strongly Disagree, Disagree, Comparatively Disagree, and Neutral responses and 1 to Comparatively Agree, Agree, and Strongly Agree responses. Therefore, the score ranges from 0 to 15, with higher scores indicating greater awareness about dementia. The Cronbach's alpha coefficients for the overall scale and its four sub-dimensions were 0.929, 0.788, 0.791, 0.806, and 0.798, respectively.

### Contact with the Dementia Population

This study examined public contact with dementia populations in two dimensions. The scale was derived from a modified version of Allport's intergroup contact hypothesis. One factor to consider is the frequency of contact when exploring the interaction between the general population and those with dementia in various social environments. The scale was derived from the five-item contact measure<sup>26</sup> (CQTS), which examines the following five contexts: (1) communication at work, (2) communal neighbourhood experiences, (3) contact through acquaintances and friends, (4) informal chats, and (5) visits to residences (See [Appendix 1, Part 3](#) for the questionnaire). Each question item scored on a seven-point Likert scale, where 1 represents "Almost never", and 7 represents "Almost always". The score ranges from 5 to 35, with higher

scores indicating a greater frequency of contact with those affected by dementia. The Cronbach's alpha coefficient for this scale in this study was 0.916.

The second factor to consider is the level of touch quality. Participants were instructed to evaluate the quality of their interaction with individuals with dementia based on six specific aspects: equality, voluntariness, intimacy, pleasantness, collaboration, and motivation. The dimensions scale was derived from the six-item Contact Quality Scale (CQLS).<sup>19</sup> The questionnaire items were rated on a seven-point Likert scale, where 1 represented "extremely low", and 7 represented "extremely high". The score ranges from 6 to 42, with higher scores indicating a superior quality of contact with those with dementia. The Cronbach's alpha coefficient for this scale in this study was 0.932. The contact variable achieved a Cronbach's alpha coefficient of 0.941.

### Dementia Stigma Attitudes

This study used the Person-Centered Dementia Public Stigma Scale (DPSS) developed by Lu et al.<sup>27</sup> This scale was used to quantify the extent of public stigma toward dementia to acquire a more objective comprehension and evaluation of public attitudes towards those with dementia and to help mitigate harmful psychosocial or social stigma against those with dementia. The DPSS consists of five dimensions, each with 16 question items. The five dimensions considered in this context are fear, discomfort, incompetence, personality, burden, and rejection. This study used 12 items and four dimensions, with four items eliminated (See [Appendix 1, Part 4](#) for the questionnaire). Each question item is answered on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The score ranges from 12 to 84. Six items were reverse scored (1, 2, 3, 10, 11, and 12). Higher scores on the other items indicate more significant negative attitudes towards dementia. The Cronbach's alpha coefficients for the total scale and its four sub-dimensions were 0.694, 0.895, 0.868, 0.763, and 0.867, respectively.

### Statistical Analysis

The survey data was analysed using the SPSS software (version 27.0). A p-value <0.05 was considered statistically significant. Descriptive statistics, such as frequencies (percentages) and means (standard deviations [SDs]), are used to present the respondent's demographic characteristics. All variables had values that fell within an acceptable range, as indicated by respectable means and SDs. Additionally, there were no missing values. One-way analysis of variance (ANOVA) tests with post-hoc Tamhane's T2 and Fisher's least significant difference (LSD) tests were used to compare dementia stigma attitudes, awareness, and contact across age groups. Pearson's correlation coefficient (r) was used to assess the correlation between public awareness of dementia, contact with individuals with dementia, and attitudes toward dementia stigma. Multiple regression was used to identify factors influencing attitudes toward stigma and to examine the relationship between awareness of dementia, contact, and attitudes toward dementia stigma. Process mediation model 4 was used to examine the mediating impact of the connection between dementia awareness and stigma attitudes toward dementia.

Given that all variables were derived from self-report questionnaires, there was a potential risk of common method bias. To mitigate this bias, procedural controls were implemented during the design phase, including anonymous responses, reverse-scored items, and semantic optimization. During the statistical phase, Harman's single-factor test was conducted for diagnostic purposes. Exploratory factor analysis revealed five factors with eigenvalues greater than one, with the first factor accounting for 18.381% of the total variance, which is below the critical threshold of 40%, indicating that common method bias is not a serious concern in this study. It should be noted, however, that Harman's single-factor test is a post-hoc diagnostic method; its function is to identify—rather than quantify or eliminate—common method variance, and it cannot preclude the possibility that variance is uniformly distributed across multiple factors. Due to constraints in data acquisition, this study was unable to employ more rigorous control strategies (eg, multi-source data, time-lagged design, or the unmeasured latent method factor approach). Therefore, although procedural controls and statistical tests suggest a low risk of common method bias, it should be acknowledged with caution that self-report questionnaires cannot entirely eliminate the influence of such method variance. Future research may adopt longitudinal designs or multi-source data collection methods to further validate the robustness of the present findings.

## Results

### Participants' Characteristics

After excluding the samples that were not genuine, this study included data from 397 individuals (young:  $n = 155$  [39%], middle-aged:  $n = 131$  [33%], and older adults:  $n = 111$  [28%]). Table 1 presents the participants' demographic characteristics. They comprised 134 males (46%) and 166 females (54%). Approximately 63% had attained a college or university education. Around 60% had limited experience engaging or participating in activities with individuals with dementia. Additionally, 30% were living with or providing informal care to individuals with dementia.

### Levels of Dementia Awareness, Contact, and Attitudes Toward Stigma Among Public Groups of Varying Ages

Table 2 compares the scores of the participants in the three age groups. One-way ANOVA test and post-hoc LSD tests indicate that the differences in dementia awareness among the three groups were not significant. However, the

**Table 1** Demographic Characteristics of the Research Participants (N = 397)

Variable	Option	Frequency	Percentage	M	SD
Sex	Male	183	46%	1.540	0.499
	Female	214	54%		
Age (years)	18–44	155	39%	2.890	0.812
	45–60	131	33%		
	≥60	111	28%		
Education level	Junior school and below	72	18%	2.940	1.321
	High/secondary school	77	19%		
	Junior college	113	29%		
	Undergraduate	71	18%		
	Master's or above	64	16%		
Occupational status	At school	41	10%	2.940	1.051
	Employed	109	28%		
	Unemployed	81	20%		
	Retirement	166	42%		
Monthly income per capita	<¥5000	112	28%	2.130	1.026
	¥5000–¥10,000	179	45%		
	¥10,000–¥30,000	64	16%		
	¥30,000–¥50,000	26	7%		
	>¥50,000	16	4%		
Experience of interacting with those with dementia	Talked to those with dementia, brief contact	115	29%	3.260	1.036
	Participated in activities with those with dementia	121	31%		
	Lived with those with dementia	102	26%		
	Cared for those with dementia	59	15%		

**Notes:** Categorical variables are presented as frequencies (n) and percentages (%); continuous variables are presented as means (M) and standard deviations (SD).

**Table 2** Dementia Awareness, Contact, and Stigma Attitudes Among the Different Age Groups

Variable	Young (18–44), N = 155	Middle-Aged (45–60), N = 131	Older Adults (≥60), N = 111	F	p	Post-hoc Comparisons	p
	Mean±SD						
Dementia awareness (0–15 points)	9.230 ± 4.849	9.900 ± 5.000	9.640 ± 5.492	0.629	0.534	MA>YA OA>YA MA>OA	0.269 0.520 0.691
Causes and Feature* (0–1 point)	0.520 ± 0.373	0.630 ± 0.38	0.630 ± 0.396	4.290	0.014	MA>YA OA>YA MA>OA	0.013 0.014 0.950
Communications and behaviours* (0–1 point)	0.650 ± 0.368	0.640 ± 0.368	0.640 ± 0.400	0.027	0.974	YA>MA YA>OA MA>OA	0.863 0.831 0.963
Nursing care precautions* (0–1 point)	0.710 ± 0.384	0.700 ± 0.380	0.680 ± 0.410	0.196	0.822	YA>MA OA>YA MA>OA	0.837 0.535 0.682
Risks and health promotion* (0–1 point)	0.610 ± 0.372	0.680 ± 0.363	0.630 ± 0.403	1.215	0.298	MA>YA OA>YA MA>OA	0.128 0.706 0.299
Contact (11–77 points)	48.170 ± 16.322	55.330 ± 13.740	55.94 ± 15.175	11.362	<0.001***	MA>YA OA>YA MA>OA	<0.001*** <0.001*** 0.984
Frequencies of contact* (1–7 points)	4.040 ± 1.799	4.900 ± 1.413	5.070 ± 1.444	17.145	<0.001***	MA>YA OA>YA OA>MA	<0.001*** <0.001*** 0.406
Qualities of contact* (1–7 points)	4.670 ± 1.453	5.140 ± 1.336	5.100 ± 1.543	4.668	0.01**	MA>YA OA>YA MA>OA	0.014 0.066 0.995
Dementia stigma attitudes (12–84 points)	45.750 ± 10.735	41.760 ± 9.160	40.760 ± 9.090	9.956	<0.001***	YA>MA YA>OA MA>OA	0.003** <0.001*** 0.777
Incapacity* (1–7 points)	3.290 ± 1.438	2.750 ± 1.313	2.660 ± 1.279	8.873	<0.001***	YA>MA YA>OA MA>OA	0.003** <0.001*** 0.930
Personality* (1–7 points)	4.710 ± 1.656	5.210 ± 1.466	5.310 ± 1.385	6.178	0.002	MA>YA OA>YA OA>MA	0.022 0.005 0.929
Burden* (1–7 points)	3.590 ± 1.690	2.920 ± 1.465	2.820 ± 1.430	10.249	<0.001***	YA>MA YA>OA MA>OA	<0.001*** <0.001*** 0.932
Exclusion* (1–7 points)	4.010 ± 1.885	4.720 ± 1.744	5.050 ± 1.697	11.810	<0.001***	MA>YA OA>YA OA>MA	0.003** <0.001*** 0.366

**Notes:** P values are based on one-way ANOVA. All P values are now presented with clear correspondence to the statistical test methods used. P<0.05\*, P<0.01\*\*, P<0.001\*\*\*. The lower the p-value, the stronger the significance, and the stronger the power to support the hypothesis or reject the null hypothesis.

**Abbreviations:** YA, young adults; MA, middle-aged adults; OA, older adults.

relationship between the contact and dementia stigma attitudes variables showed partial significant differences across all age groups, with all results significant at  $P < 0.001$ .

Regarding dementia awareness, the mean score was 9.230 (SD = 4.849) in the young group, 9.900 (SD = 5.000) in the middle-aged group, and 9.640 (SD = 5.492) in the older adult group. The middle-aged group had greater dementia awareness than the young and older adult groups. The mean scores for contact with those with dementia were 48.170 (SD = 16.322), 55.330 (SD = 13.740), and 55.940 (SD = 15.175), respectively. The older adult group exhibited greater contact with those with dementia than the middle-aged and young groups. In contrast, the mean scores for the stigma attitude variable were 45.750 (SD = 10.735),

41.760 (SD = 9.160), and 40.760 (SD = 9.090), respectively. The young group had more stigmatising sentiments than the middle-aged and older adult groups.

## Correlation and Multiple Linear Regression Analyses of Dementia Stigma Attitudes, Contact, and Awareness

Table 3 shows strong associations between stigma attitudes, contact, and dementia awareness. Participants' dementia awareness and contact behaviour were positively correlated ( $r = 0.675$ ,  $p < 0.001$ ), implying that the more people are inclined to contact those with dementia, the more they know about dementia. This result implies that, to some extent, the public's understanding of dementia affects how they interact with those with dementia. Participants' dementia awareness and stigma attitudes correlated negatively ( $r = -0.576$ ,  $p < 0.001$ ), as did their contact behaviour and stigma attitudes ( $r = -0.551$ ,  $p < 0.001$ ). Furthermore, multiple linear regression analyses for all participants' stigma attitudes revealed that exposure ( $\beta = -0.298$ ,  $p < 0.001$ ) and dementia awareness ( $\beta = -0.375$ ,  $p < 0.001$ ) were strongly negatively associated with stigma attitudes (Table 4). This finding implies that as dementia awareness increases and contact activities increase, public stigma views toward the dementia population decrease. The general public can more naturally sense the needs and real-life status of those with dementia, and the more frequently they interact with them, the greater the quality of those interactions. Such first-hand accounts frequently arouse public understanding and sympathy, which decreases the stigmatisation of those with dementia. Their degree of stigma attitudes is low because they are more tolerant and inclusive than other groups of individuals.

### Sample Size Calculation and Power Analysis for Regression

To ensure the credibility of the analytical results, a retrospective power analysis was additionally conducted using G Power software, following the classic framework established by Cohen (1988). The specific calculation steps were as follows:

1. Calculation of the overall model effect size: The overall explanatory strength of the regression model was first assessed using Cohen's  $f^2$  indicator. The formula is:

$$f^2 = \frac{R^2}{1 - R^2}$$

where  $R^2$  is the coefficient of determination of the regression model. This metric measures the degree to which the model deviates from the null model.

2. Calculation of the unique effect size for predictors: To evaluate the independent contribution of each independent variable after controlling for the other variable, the "partial  $f^2$ " was calculated using the following formula:

$$f^2_{\text{pary}} = \frac{t^2 - (1 - R^2)}{df_{\text{error}}}$$

where  $t$  is the  $t$ -test value for the corresponding predictor in the regression, and  $df_{\text{error}}$  is the residual degrees of freedom of the regression model ( $N - p - 1$ ), with  $p$  being the number of predictors).

3. Statistical power assessment: Based on the observed effect sizes calculated above, a post-hoc power analysis was performed using G Power software.

The regression analysis results showed that the model composed of dementia knowledge and contact level significantly predicted the dependent variable. The overall model was significant,  $F(2, 394) = 120.805$ ,  $p < 0.001$ ) and explained 38.0% of the variance in the dependent variable  $R^2 = 0.380$ , adjusted  $R^2 = 0.377$ .

According to formula (1), the overall effect size of the model was calculated as:

$$f^2 = \frac{R^2}{1 - R^2} = \frac{0.380}{1 - 0.380} = 0.613$$

Based on Cohen's (1988) criteria  $f^2$  values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively), this model demonstrates a large effect.

**Table 3** Correlations Between Dementia Awareness, Contact, and Stigma Attitudes

Variable/Dimension	Awareness of Dementia	Causes and Features*	Communications and Behaviours*	Nursing Care Precautions*	Risks and Health Promotion*	Contact	Frequencies of Contact*	Qualities of Contact*	Dementia Stigma Attitudes	Incapacity*	Personality*	Burden*	Exclusion*
Awareness of dementia	1												
Causes and features*	0.865**	1											
Communications and behaviours*	0.903**	0.699**	1										
Nursing care precautions*	0.876**	0.632**	0.766**	1									
Risks and health promotion*	0.903**	0.702**	0.732**	0.764**	1								
Contact	0.675**	0.677**	0.576**	0.497**	0.621**	1							
Frequencies of contact*	0.614**	0.669**	0.504**	0.411**	0.562**	0.913**	1						
Qualities of contact*	0.626**	0.578**	0.553**	0.500**	0.578**	0.923**	0.687**	1					
Dementia stigma attitudes	-0.576**	-0.531**	-0.504**	-0.483**	-0.519**	-0.551**	-0.593**	-0.424**	1				
Incapacity*	-0.690**	-0.617**	-0.610**	-0.603**	-0.618**	-0.653**	-0.604**	-0.596**	0.849**	1			
Personality*	0.614**	0.575**	0.534**	0.505**	0.555**	0.673**	0.569**	0.664**	-0.363**	-0.701**	1		
Burden*	-0.597**	-0.527**	-0.501**	-0.512**	-0.576**	-0.611**	-0.624**	-0.503**	0.837**	0.729**	-0.550**	1	
Exclusion*	0.530**	0.558**	0.468**	0.378**	0.455**	0.594**	0.660**	0.437**	-0.865**	-0.687**	0.455**	-0.740**	1

**Notes:** P values are based on Pearson correlation analysis. All P values are now presented with clear correspondence to the statistical test methods used. P<0.05\*, P<0.01\*\*.

**Table 4** Multiple Linear Correlations with Dementia Stigma Attitudes

Model	Non-Standardised Coefficients		Standardised Coefficient	t	p	VIF	Partial f <sup>2</sup>	Statistical Power (1-β)
	B	SE	β					
(Constants)	5.014	0.118		42.482	<0.001			
Dementia awareness	-0.923	0.132	-0.375	-6.974	<0.001	1.838	0.077	>0.999
Contact	-0.175	0.032	-0.298	-5.536	<0.001	1.838	0.048	0.996
R <sup>2</sup> : 0.380 Adjusted R <sup>2</sup> : 0.377 F: 120.805 p: <0.001*** Dependent variable: dementia stigma attitudes								

Note: P<0.001\*\*\*.

Regarding the specific predictor variables (detailed in Table 1): both dementia knowledge ( $\beta = -0.330$ ,  $t(394) = -6.974$ ,  $p < 0.001$ ) and contact level ( $\beta = -0.262$ ,  $t(394) = -5.536$ ,  $p < 0.001$ ) had significant negative predictive effects on the dependent variable.

Applying formula (2), the unique contributions (partial f<sup>2</sup>) of the two variables were calculated as follows, with both falling into the medium effect category:

Dementia knowledge:

$$f^2_{\text{par}} = \frac{t^2 - (1 - R^2)}{df_{\text{error}}} = \frac{(-6.974)^2 \times 0.620}{394} = 0.0765$$

Contact level:

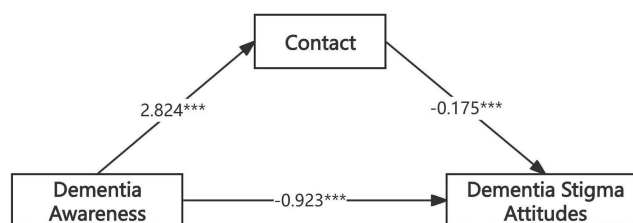
$$f^2_{\text{par}} = \frac{t^2 - (1 - R^2)}{df_{\text{error}}} = \frac{(-5.536)^2 \times 0.620}{394} = 0.0482$$

The results of the post-hoc power analysis indicated that, given the current sample size ( $N=397$ ) and alpha level (0.05), this study possessed exceptionally high statistical power. The power to detect the overall large effect ( $f^2 = 0.613$ ) was greater than 0.999. Furthermore, the power to detect the two medium unique effects of dementia knowledge and contact level (partial  $f^2 = 0.077$  and  $0.048$ , respectively) was greater than 0.999 and 0.996, respectively. This implies an extremely low risk of committing a Type II error (failing to detect an effect that actually exists) in this study, confirming the robustness of the statistical conclusions.

## The Significance of Contact in Mediating the Relationship Between Dementia Awareness and Attitudes Towards Stigma

In order to explore the cause of the strong negative effects of dementia awareness on stigma attitudes, contact was added as a mediating variable in the structural equation model. The mediating effect was assessed using the SPSS software's Process model. The mediating role of exposure in the association between dementia awareness and stigma attitudes was validated using a bootstrap approach, as outlined by Hayes (Figure 1).

Table 5 presents the mediation analysis results. The bootstrap 95% confidence intervals for the indirect effect of dementia awareness on stigma attitudes through contact did not include zero, confirming a significant mediating role of contact. Specifically, dementia awareness had a direct negative effect on stigma attitudes ( $\beta = -0.923$ ,  $p < 0.001$ , 95% CI [-1.184, -0.663]) and an indirect effect via contact ( $\beta = -0.175$ ,  $p < 0.001$ , 95% CI [-0.237, -0.113]). The total effect of dementia awareness on stigma attitudes was  $-1.418$  ( $p < 0.001$ ), with the direct effect accounting for 65% and the indirect effect accounting for 35% of the total variance. Additionally, dementia awareness was positively associated with contact ( $\beta = 2.824$ ,



**Figure 1** A diagram of the path coefficients for dementia awareness, contact, and stigma attitudes.  
**Note:**  $P < 0.001$ \*\*\*.

$p < 0.001$ , 95% CI [2.519, 3.129]), indicating that greater awareness facilitates more contact experiences. These findings suggest that contact partially mediates the relationship between dementia awareness and stigma attitudes, underscoring the importance of promoting intergroup contact as a strategy to reduce dementia-related stigma.

## Discussion

This study employed a cross-sectional survey design to investigate differences in stigmatizing attitudes toward people with cognitive impairment (dementia) across age groups in the Chinese public, with a particular focus on the roles of dementia knowledge and contact experiences. Mediation analysis using the PROCESS macro indicated that contact partially mediated the relationship between dementia knowledge and stigmatizing attitudes. It is important to emphasize that, given the cross-sectional nature of this study, all findings should be interpreted as correlational rather than causal; the proposed mediation pathway represents a theory-driven statistical hypothesis requiring further validation through longitudinal or experimental designs.

Consistent with prior research, participants demonstrated a moderate level of dementia knowledge, yet significant age-group differences emerged in contact frequency and stigmatizing attitudes. Specifically, the middle-aged group exhibited slightly higher knowledge levels, while the older adult group reported the most frequent and higher-quality contact with people living with dementia. In contrast, although the young adult group displayed knowledge levels comparable to other groups, they manifested the highest degree of stigmatizing tendencies. This pattern aligns with findings from North American studies, where older adults tend to feel more at ease and familiar when interacting with individuals with dementia.<sup>28</sup> A plausible explanation is that older adults, through their personal experiences with age-related vulnerabilities, may develop greater empathic capacity and a more nuanced understanding of the challenges associated with dementia. Similarly, middle-aged individuals who often assume informal caregiving roles may deepen their understanding of the disease through direct care experiences, thereby attenuating prejudicial attitudes.

Correlation analyses revealed that dementia knowledge was positively associated with contact behavior and negatively associated with stigmatizing attitudes, while contact behavior was also negatively associated with stigmatizing attitudes.<sup>29–31</sup> Building on these findings, mediation analysis further demonstrated that contact behavior partially explained the association between knowledge and stigma (indirect effect =  $-0.495$ , 95% CI [ $-0.662$ ,  $-0.341$ ]), suggesting that enhanced knowledge may reduce stigma, in part, by facilitating meaningful contact. However, this indirect effect should not be overinterpreted as evidence of a causal mechanism, but rather regarded as a theoretically plausible pathway warranting testing in future intervention or quasi-experimental studies. Notably, the mediation effect accounted for only 35% of the total effect, indicating that other unmeasured factors—such as cultural norms, personal values, or prior

**Table 5** Total, Direct and Intermediary Effects of Exposure on the Relationship Between Dementia Awareness and Stigma Attitudes

Effect	Effect	SE	Lower CI	Upper LCI	Effective Quantity
Total	-1.418	0.101	-1.617	-1.219	
Direct	-0.923	0.132	-1.184	-0.663	65%
Intermediary	-0.495	0.120	-0.737	-0.272	35%

caregiving experiences—also play important roles in shaping stigmatizing attitudes. Indeed, cross-national surveys conducted in Cambodia, the Philippines, and Fiji have shown that, despite relatively low public knowledge about dementia, stigmatizing attitudes toward affected individuals were generally not pronounced, underscoring the profound influence of sociocultural context.<sup>28</sup> This finding further suggests that anti-stigma intervention strategies must situate the knowledge-contact-stigma nexus within specific community and cultural contexts.

## Implications for Public Health and Community Practice

Although this study provides only correlational evidence, it offers several reference points for community-level anti-stigma interventions targeting dementia. First, the significant association between knowledge and stigma via contact suggests that intervention approaches combining knowledge dissemination with structured, positive contact scenarios may be superior to information campaigns alone. Second, the marked age-group differences indicate that uniform intervention strategies are unlikely to achieve equivalent effects across generations. For younger adults, who have limited contact but higher stigma levels, contact-based interventions could be delivered through schools or social media platforms. In contrast, older adults, who possess rich contact experience, could serve as peer advocates modeling and transmitting accepting attitudes. Third, the partial mediation model implies that interventions targeting only knowledge enhancement have inherent limitations; community programs should intentionally embed opportunities for positive intergroup contact—such as intergenerational volunteer services, community inclusion activities, or dementia-friendly interest groups—to facilitate the actual translation of knowledge into attitude change.

## Limitations and Future Directions

This study has several limitations. First, the sample was drawn exclusively from Shanghai, limiting the generalizability of findings to regions with substantially different socioeconomic and cultural characteristics. Second, the contact scale used was adapted from existing instruments and may not fully capture the multidimensional nature of public contact with people living with dementia; future research should employ specialized scales that have been validated in local contexts. Third, this study did not systematically examine potential confounding effects of demographic covariates such as educational level or prior caregiving experience on the observed associations; subsequent studies should statistically control for these variables. Fourth, the cross-sectional design precludes causal inference; future research should adopt longitudinal or quasi-experimental designs to examine the temporal dynamics of knowledge, contact, and stigmatizing attitudes across different age cohorts. Given the limited sample size, the current findings should be regarded as preliminary exploration and hypothesis generation, pending validation in larger and more diverse samples.

## Conclusion

This study analyzed differences in stigmatizing attitudes toward people with dementia across age groups, revealing that middle-aged and older adults exhibited deeper understanding and acceptance compared to younger adults. The research further elucidated the mediating role of contact experiences in the relationship between enhanced knowledge and reduced stigma: greater public awareness about dementia may facilitate increased contact with affected individuals, which in turn fosters positive relationships and diminishes negative attitudes toward this population. This finding highlights the synergistic role of cognitive enhancement and direct personal contact in shaping public stigma perceptions, and offers an integrated intervention approach for building dementia-friendly communities and eliminating social stigma. Future efforts should focus on improving public awareness and understanding of dementia. It is recommended to develop educational programs targeting younger adults and create opportunities for them to interact with people living with dementia. Additionally, community-level communication should be strengthened to systematically advance dementia awareness education across community, institutional, and individual levels. The ultimate goal is to ensure that people with dementia and their caregivers can fully participate in social activities, while providing a theoretical framework and practical guidance for constructing dementia-friendly communities suited to China's specific national conditions.

## Data Sharing Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Ethics Approval and Consent to Participate

The Human Research Ethics Committee—Humanities of School of Medicine, Tongji University, approved this study (Ref: ECHTJ 2023-10). The patients/participants provided their written informed consent to participate in this study.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors report no conflicts of interest in this work.

## References

- Scheltens P, De Strooper B, Kivipelto M, et al. Alzheimer's disease. *Lancet*. 2021;397(10284):1577–1590. doi:10.1016/S0140-6736(20)32205-4
- World Health Organization. Global status report on the public health response to dementia. Geneva: World Health Organization; 2021.
- Jia L, Du Y, Chu L, et al. Prevalence, risk factors, and management of dementia and mild cognitive impairment in adults aged 60 years or older in China: a cross-sectional study. *Lancet Public Health*. 2020;5(12):e661–e671. doi:10.1016/S2468-2667(20)30185-7
- Buckner S, Darlington N, Woodward M, et al. Dementia Friendly Communities in England: a scoping study. *Int J Geriatr Psychiatry*. 2019;34(8):1235–1243. doi:10.1002/gps.5123
- Link BG, Phelan JC. Conceptualizing stigma. *Annu Rev Sociol*. 2001;27:363–385. doi:10.1146/annurev.soc.27.1.363
- Alzheimer's Disease International. World Alzheimer Report 2019: attitudes to dementia. London: ADI; 2019.
- Herrmann LK, Welter E, Leverenz J, et al. A systematic review of dementia-related stigma research: can we move the stigma dial? *Am J Geriatr Psychiatry*. 2018;26(3):316–331. doi:10.1016/j.jagp.2017.09.006
- Corrigan PW, Morris SB, Michaels PJ, Rafacz JD, Rüsch N. Challenging the public stigma of mental illness: a meta-analysis of outcome studies. *Psychiatr Serv*. 2012;63(10):963–973. doi:10.1176/appi.ps.201100529
- Farina N, Suemoto CK, Burton JK, Oliveira D, Frost R. Perceptions of dementia amongst the general public across Latin America: a systematic review. *Aging Ment Health*. 2021;25:5787–5796. doi:10.1080/13607863.2020.1725738
- Werner P, Kim S. A cross-national study of dementia stigma among the general public in Israel and Australia. *J Alzheimers Dis*. 2021;83:1103–1110.
- Kim S, Anstey KJ, Mortby ME. Who displays dementia-related stigma and what does the general public know about dementia? Findings from a nationally representative survey. *Aging Ment Health*. 2023;27:61111–61119. doi:10.1080/13607863.2022.2040428
- Lee S, Jeong H, Koh IS, Suh J, Cho HS. Association of knowledge about dementia with two dimensional attitudes among a community population in South Korea. *J Alzheimers Dis*. 2023;92:2565–2572.
- Hakami F, Madkhali MA, Saleh E, et al. Awareness and perception toward Alzheimer's disease among residents living in the Jazan Province, Saudi Arabia: a cross-sectional study. *Cureus*. 2023;15:91–93.
- Hurzuk S, Farina N, Pattabiraman M, Ramasamy N, Alladi S. Understanding, experiences and attitudes of dementia in India: a qualitative study. *Dementia*. 2022;21:72288–72306. doi:10.1177/14713012221118774
- Hossain MZ, Stores R, Hakak Y, Crossland J, Dewey A. Dementia knowledge and attitudes of the general public among the Bangladeshi community in England: a focus group study. *Dement Geriatr Cogn Disord*. 2020;48:5290–5296.
- Gao X, Sun F, Prieto L, Lyengar V. Perceived stigma towards Alzheimer's disease and related dementia among Chinese older adults: do social networks matter? *Ageing Soc*. 2022;42:51100–51116. doi:10.1017/S0144686X20001294
- Yang T, Huang Y, Li X, Li M, Ma S. Knowledge, attitudes, and stigma related to dementia among illiterate and literate older adults in Shanghai. *Risk Manag Healthc Policy*. 2021;14:959–966. doi:10.2147/RMHP.S296044
- Chang CY, Hsu HC. Relationship between knowledge and types of attitudes towards people living with dementia. *Int J Environ Res Public Health*. 2020;17:113777.
- Noguchi T, Nakagawa T, Komatsu A, Shang E, Murata C. Interactions with people with dementia, learning experiences, and public stigma against dementia. *Innov Aging*. 2022;6:526. doi:10.1093/geroni/igac059.2006
- Allport GW. *The Nature of Prejudice*. Addison-Wesley; 1954.
- Pettigrew TF, Tropp LR. A meta-analytic test of intergroup contact theory. *J Pers Soc Psychol*. 2006;90(5):751–783. doi:10.1037/0022-3514.90.5.751
- O'Connor ML, McFadden SH. Development and psychometric validation of the dementia attitudes scale. *Int J Alzheimers Dis*. 2010;2010:454218.
- Cheston R, Hancock J, White P. A cross-sectional investigation of public attitudes toward dementia in Bristol and South Gloucestershire using the approaches to dementia questionnaire. *Int Psychogeriatr*. 2016;28:101717–101724. doi:10.1017/S1041610216000843
- Yu P, Wang J, Hu J, et al. The standard for healthy Chinese older adults (WS/T 802-2022). *Chin J Geriatr*. 2022;41(11):1263.

25. Hung SP, Liao YH, Eccleston C, Ku LE. Developing a shortened version of the dementia knowledge assessment scale (DKAS-TC) with a sample in Taiwan: an item response theory approach. *BMC Geriatr.* 2022;22:1886. doi:10.1186/s12877-022-03596-1
26. Islam MR, Hewstone M. Dimensions of contact as predictors of intergroup anxiety, perceived out-group variability, and out-group attitude: an integrative model. *Pers Soc Psychol Bull.* 1993;19:6700–6710. doi:10.1177/0146167293196005
27. Lu J, Shan Y, Ji M, Low L-F, Kim S. Development of a method and an assessment construct for person-centered translation of dementia public stigma scales. *Front Public Health.* 2024;11:1233400. doi:10.3389/fpubh.2023.1233400
28. Newton C, Hadjistavropoulos T, Gallant NL, MacNab YC. Age differences in attitudes about older adults with dementia. *Ageing Soc.* 2021;41:1121–1136. doi:10.1017/S0144686X19000965
29. Cheston R, Hancock J, White P. Does personal experience of dementia change attitudes? The Bristol and South Gloucestershire survey of dementia attitudes. *Dementia.* 2019;18:72596–72608. doi:10.1177/1471301217752707
30. Wang Y, Xiao LD, Luo Y, Xiao SY, Whitehead C, Davies O. Community health professionals' dementia knowledge, attitudes and care approach: a cross-sectional survey in Changsha, China. *BMC Geriatr.* 2018;18:1–10. doi:10.1186/s12877-018-0821-4
31. Zhao W, Moyle W, Wu MLW, Petsky H. Hospital healthcare professionals' knowledge of dementia and attitudes towards dementia care: a cross-sectional study. *J Clin Nurs.* 2022;31:1786–1799. doi:10.1111/jocn.15590

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