Utilizing Consumer-directed Care Among Older Adults: Identifying Barriers from Behavioral Economics Perspectives

Abstract

Consumer-directed Care (CDC) empowers older people to flexibly arrange services and enhances their well-being. Prior studies have suggested that limited attention and hassle costs are major demand-side barriers to using CDC. However, many other psychosocial factors were unexplored. In this study, we explore associations between CDC utilization and a wider range of psychosocial factors based on behavioral economics theories. A cross-sectional telephone survey of older persons (or family members that represent them) was conducted in Guangzhou, China in 2021. We adopted a two-stage sampling method based on administrative records and analyzed the data using multivariate logistic models. Procedural literacy, hassle costs, and social norms regarding CDC were associated with using CDC. The findings reveal nuances in the decision-making process, and people are not unboundedly rational in making care-related decisions. Policymakers could employ cost-effective tools to facilitate CDC utilization and optimize resources to address the most crucial service barriers.

Introduction

Unlike conventional agency care (CAC), where social and healthcare professionals determine service arrangements, consumer-directed care (CDC, also known as cash-for-care, individual funding, and self-/participant-directed care) empowers older people with disabilities to organize publicly-funded in-home services in accordance with individualized preferences and needs. Many CDC programs, such as Direct Payment in the United Kingdom (UK) and cash benefits in German long-term care insurance, give clients autonomy and control over personal assistance services, including scheduling care activities and hiring family members or acquaintances as care workers. Such a service model provides tailored services for older adults, thereby enabling them to age in their own homes and enhance their quality of life (Pattyn et al., 2021).

As positive effects of CDC policies on older adults have been repeatedly documented in the existing literature, the research focus in CDC literature has shifted from investigating service effectiveness to examining directions to improve the CDC program implementation process and to overcome access barriers for clients (Ettelt et al., 2018; Steiner et al., 2022). Extant studies have identified two major obstacles to using CDC: information asymmetry and hassle costs. Lacking accessible information about programs and eligibility criteria hinders people from using CDC (Kan & Chui, 2021). Likewise, hassle costs refer to non-monetary efforts or inconveniences associated with claiming CDC programs, such as too much paperwork and bureaucracy, which hampers access to CDC (Carey et al., 2021; Davey et al., 2007; Leece & Leece, 2005). Nevertheless, these two barriers cannot fully explain the suboptimal take-up rates of CDC as multiple psychosocial factors, including choice overload and social norms, may play a role in enrolment decisions.

Merely eliminating information asymmetry and reducing hassle costs may not sufficiently help individuals who are eligible for CDC to take up such service. More evidence on how a more complete range of psychosocial factors are associated with CDC utilization is needed.

Based on CDC programs implemented in Guangzhou, China, this study explores psychosocial factors associated with CDC utilization from the perspective of behavioral economics and examines the relative contribution of each factor. By adopting Congdon and colleagues' (2011) classification of behavioral economics theories framework, this study delineates nuances in individual-level demand-side barriers, that is, factors influencing individuals' ability to access CDC (Carey et al., 2019). Barriers identified in this paper can be malleable by policymakers or practitioners through interventions, which can inform the redesign of CDC implementation to facilitate service utilization and ultimately enhance older adults' well-being.

Institutional Background

Traditionally, family members have assumed primary responsibilities for caring for older persons in China. Since the 1950s, the Chinese government has provided formal long-term care exclusively for welfare recipients who have no children or families. Recently, China has undergone profound socio-demographic transformations—most notably, an escalating ageing population and declining younger generations and family size—that raise policy concerns in supporting older persons. To address the ever-growing care needs, the government began piloting long-term care insurance (LTCI) among 15 cities (e.g., Guangzhou and Shanghai) in 2016. In 2020, the central government expanded the policy

experimentation to 49 cities. Financed by social health insurance, LTCI provides publicly funded home-based services and institutional care for frail older persons.

Emerging research on LTCI in China has concentrated on the effectiveness and challenges of these policies. Introducing LTCI resulted in reduced family care burden and improved health outcomes (e.g., fewer unmet needs, better health status, and reduced healthcare utilization) for older persons (Chen & Ning, 2022; Lei et al., 2022). Meanwhile, recent studies have suggested two major challenges within the new system: the sustainability of financing mechanisms considering the growing older population (Xu & Chen, 2019; Zhang et al., 2020) and the inequity in access services and LTCI for rural residents and the poor (Yang et al., 2020; Zhu & Österle, 2019). However, these studies did not investigate obstacles regarding the use of CDC among older clients.

This study was conducted in Guangzhou (also called Canton), the capital city of Guangdong Province. Located in the Pearl River Delta roughly 75 miles northwest of Hong Kong, the city serves as the central manufacturing hub and transhipment port. As of 2020, Guangzhou's gross domestic product (GDP) per capita reached 135 thousand CNY (21,223 USD), which ranked 13th among metropolises in China, and its population was approximately 9.85 million, of whom 13.01% were aged 65 or above, close to the 13.50% figure for the whole nation (Guangzhou Statistics Bureau, 2021).

As one of the 15 pioneer cities, Guangzhou's government introduced LTCI in August 2017. Initially, the system covered only urban employees who worked in formal sectors and contributed to social insurance through their employers. In January 2021, the government achieved universal coverage for LTCI by entitling formerly excluded urban residents without formal jobs or employers' contributions and rural residents with or

without jobs. Regardless of age, all people with physical or cognitive impairments can apply for the benefits. At the end of March 2021, the number of beneficiaries was 21,063, of whom 15,975 received services at home and 5,088 entered nursing homes.

Guangzhou's LTCI pays a lump sum to beneficiaries contingent on their dependency levels, irrespective of individual income or wealth. The benefits cover care-related costs, including housekeeping and personal care, nurse visits, and leasing assistive devices. Beneficiaries are entitled to choose home-based services and institutional care. To receive home-based care, applicants must find a private for-profit home-based agency that is commissioned by the government to provide long-term care. Next, the agency initially screens potential beneficiaries and refers them to commercial insurance companies designated by the government to perform need assessment.

Eligible home-based care clients can choose between self-directed and agency-directed care. The self-directed care option empowers beneficiaries to hire care workers, such as family members and domestic helpers. In the agency-directed care model, however, care agencies act as professionals who have the authority to organize care services, including designating agency workers, scheduling service visits, and recruiting and dismissing care workers. These two service options in Guangzhou resonate with the definitions of CDC and CAC, respectively.

Of the few studies to uncover barriers to accessing LTCI in Guangzhou, Wu and colleagues (2020) found that people with dementia failed to apply for LTCI benefits because the need assessment tool, i.e., the Barthel index, did not assess claimants' cognitive impairments. Additionally, Zhang and colleagues (2021) suggested that permitting people to control and direct services and providing more information and support might increase

service utilization in Guangzhou. Other barriers to accessing LTCI, especially demand-side factors, remain unknown.

Barriers to Access CDC

Older persons fail to enroll in CDC services when they are eligible. For example, about 35% of older Americans expressed an interest in CDC, whereas less than 10% actually used such services (Ottmann et al., 2009). In England, a large gap existed between anticipated enrolment (over 400 persons) and actual utilization (only 40 persons) of the CDC program in residential care (Ettelt et al., 2018). Though older clients can benefit from consumer direction as much as younger generations, only 13.75% of community-dwelling older clients used the CDC program, which was one-third of their younger counterparts (37.82%) (Office for National Statistics, 2022). The suboptimal take-up can lead to the loss of autonomy and independence for older persons, which imposes constraints on them to optimize service arrangements and achieve better care outcomes. Hence, research on barriers to CDC utilization is of great importance.

Barriers to using CDC stem from the supply side and the demand side. Supply-side constraints are aspects of long-term care systems that impede service utilization, including inadequate budgets, inaccessible services, and resistance from social workers. Specifically, people perceived CDC as a cost-cutting instrument and were loath to enroll in such programs in the United States (US) if the budget was comparably lower than CAC (Manthorpe et al., 2011). In Hong Kong, without accessible service providers to choose from, people with physical or cognitive impairments could not afford long-distance travelling, so they had no choice but to forgo using CDC (Kan & Chui, 2021). Additionally,

in England, social workers' patronizing attitudes about potential users' capacity to realize self-direction discouraged older persons to choose CDC services (Leece & Leece, 2005).

In contrast to supply-side barriers, demand-side determinants relate to factors influencing individuals' ability to use CDC, such as ethnicity, financial resources, service literacy, and hassle costs (Carey et al., 2019). Compared with White Western European Americans, Latino and Chinese clients had higher intentions to use CDC over CAC (Sciegaj et al., 2004). Leece and Leece (2005) suggested that, in the UK, CDC users were younger, with more functional impairments and higher income than their CAC counterparts. People with low awareness of programs and their rights for service selection, as well as confusion about program rules, failed to use CDC (Davey et al., 2007; Manthorpe et al., 2011). Some who preferred participating in CDC programs in the US and the UK had difficulty completing the complex and time-consuming application process, including paperwork related to developing spending plans and conducting criminal background checks for care workers (Davey et al., 2007).

Existing studies have revealed that supply-side and demand-side barriers inhibit older adults from accessing CDC services. However, evidence for demand-side factors mainly used qualitative methods, focusing on service literacy and hassle costs, and thus overlooked additional psychological obstacles crucial to facilitating service utilization. Psychosocial factors, especially from the behavioral economics perspective, have played a significant role in understanding the low take-up rates of social benefits. Nonetheless, these factors are not empirically examined in understanding barriers to using CDC. Also, the relative importance of each constraint has yet to be examined, which can guide policymakers and practitioners to prioritize using limited resources on interventions that

can mitigate the most crucial barriers. To fill these gaps, this study investigated the association between CDC utilization and psychosocial factors by employing behavioral economics theories and examining the relative strength of each barrier.

Behavioral Economics and Service Utilization

Traditional economics theories presume that individuals are rational decision-makers who maximize their utility, have time-consistent preferences, and act as self-interested agents. However, this rationality assumption ignores the psychosocial and social influences, such as cognitive bias and social norms, on behaviors (Mertens et al., 2022). Departures from rationality can be even more severe among older persons in need of care as their cognitive deficits and poor health status limit their ability to optimize decisions perfectly and implement intentions. Against this backdrop, behavioral economics employs psychosocial principles to predict and affect human behaviors, a perspective shown to increase the take-up of social benefits, such as health insurance and disability programs (Deshpande & Li, 2019; Fox et al., 2022; Herd et al., 2013).

Congdon and colleagues (2011) categorized these departures of human behaviors from rationality into three domains of psychosocial factors: imperfect optimization, bounded self-control, and nonstandard preferences. First, imperfect optimization captures errors that people make in selecting among alternatives, including having desires that do not match hedonic utility and making choices that do not correspond with their desires (Congdon et al., 2011). This arises because individuals have a limited capacity to collect all relevant information, process it appropriately, and make decisions that optimize their welfare. Constrained by limited attention and choice overload, many individuals cannot decide whether to use social benefits or services. Limited attention means people only pay

attention to a restricted amount of information at any given time, especially in a complex information environment. Before deciding whether to use in-home services, individuals need to gather all necessary program information, such as service options, benefit amounts, and application procedures, which is often challenging for potential participants due to their limited attention (Baxter et al., 2021). For example, in England, approximately 40% of older people receiving social care were unaware of their budget amounts, and 17% of clients were dissatisfied with information and advice (In Control, 2017). Owing to limited attention, clients may not notice all information for accessing to CDC as they possess limited service and procedural knowledge (Baxter et al., 2021). Accordingly, we formulated hypothesis 1a: *Limited attention is negatively associated with CDC utilization.*

Additionally, individuals' rationality is also constrained by the problem of choice overload. It captures a situation where people's cognitive capacity is insufficient to handle the complexity of a decision problem they encounter (Congdon et al., 2011). Confronted with a vast array of decision alternatives, people felt overwhelmed and could not make informed choices when selecting health insurance and prescription drug plans (Chernev et al., 2015; Hibbard & Peters, 2003). Older persons in need of care had limited cognitive or mental capacities to process information, compare care options, and select the most suitable services (Baxter et al., 2021; Meinow et al., 2011). On these grounds, we derived hypothesis 1b: *Choice overload is negatively associated with CDC utilization.*

Second, in addition to imperfect optimization, humans can be restrained by their bounded self-control to that involves a tendency to fail to implement their desires, even when they know their desires. People often plan to take a certain action but do not behave accordingly because they are influenced by hassle costs and procrastination (Madrian,

2014). As mentioned earlier, hassle costs refer to minor barriers or inconveniences that people experience, such as extensive paperwork and other time-consuming procedures that prevent them from taking up social benefits. For example, in applying for Social Security Disability Insurance in the US, any increase in application costs, including travel time to neighboring field offices, reduced applicants by 10% and beneficiaries by 16%. The negative effects were even more salient among those with low income, low education attainment, and moderately severe health conditions (Deshpande & Li, 2019). Prior CDC research has also suggested that hassle costs in paperwork hinder access to CDC (Davey et al., 2007). As a result, we formulated hypothesis 2a: *Hassle costs perceived by individuals is negatively associated with CDC utilization.*

Furthermore, individuals often succumb to inertia and procrastination, despite the adverse consequences of inaction and delay on their well-being (Steel, 2007). For example, people delayed signing up for 401(k)'s and transferring savings into higher interest accounts, even when the long-term benefits were enormous (Madrian & Shea, 2001). Moreover, procrastination increased when people were confronted with unpleasant tasks (Steel, 2007). Typically, older persons who need care experience ambivalence when selecting informal and formal care programs and worry about losing their independence (de São José et al., 2016). As these high-stake decisions are difficult and stressful, older persons may refrain from taking action. Situations like these led to hypothesis 2b: *Procrastination is negatively correlated with CDC utilization.*

Lastly, people can hold nonstandard preferences that individuals have preferences that are other-regarding and assess options based on changes in their current situations rather than evaluating these options solely based on their final outcomes (Congdon et al.,

2011). Individual preferences can be shaped by social norms and status quo bias. People often behave in a way that adheres to social norms or other people's expectations (Madrian, 2014). Norms affect human behaviors in two ways: through information provision and peer pressure (Thaler & Sunstein, 2009). In Norway, for instance, peers from one's workplace and family network served as information transmission channels and contributed to the participation of paid paternity leave, particularly in settings where people had little program knowledge (Dahl et al., 2014). Moreover, enthusiastic recommendations and encouragement by peers facilitated the enrolment of the CDC voucher scheme in Hong Kong (Kan & Chui, 2021). Based on these, and other examples, we formulated hypothesis 3a: *Favourable social norms about CDC is positively associated with CDC utilization*.

Status quo bias refers to the tendency of individuals to maintain current or default options even when superior alternatives are present. For example, people sticked with their current health plans rather than switched to more optimal ones if they viewed the change as more deleterious than rewarding (Schneider, 2004). Concerning loss aversion, people give more weight to avoiding losses than to pursuing gains, and the perceived costs of change are more intense than the perceived benefits, creating a relative advantage for the status quo choice (Eidelman & Crandall, 2012). Likewise, endowment effects show that people value the goods they own partly because of their tendency to avoid losses (Thaler, 2015). In Guangzhou, people may prefer to maintain previous care arrangements, such as hiring care workers they are familiar with and have been attached to. This preference can be achieved by CDC services. Consequently, hypothesis 3b is: *Status quo bias is positively correlated with CDC utilization*.

Extant evidence has shown that the abovementioned factors influence the uptake of social benefits in various policy domains. However, no study to our knowledge has explored the extent to which these factors are associated with accessing CDC. Clarifying the causes of non-utilization can inform policymakers on how to improve policy designs and secure older persons to receive services that best match their preferences. Moreover, the relative role of barriers in utilizing CDC remains unknown. Without such inquiry, policymakers and practitioners cannot determine the relative significance of barriers, either underestimating some that have substantial influences or overestimating obstacles that have little effect, thus hindering their capacity to develop optimal strategies to overcome these impediments. This study uses behavioral economics theories that are vital to service take-up but neglected in CDC literature to explore demand-side barriers. The goal is to provide evidence for understanding barriers to accessing long-term care services and suggest cost-effective policy tools to overcome obstacles and enhance older persons' well-being.

Method

Data Collection

A cross-sectional telephone administered survey using a two-stage sampling approach was adopted in this study. We first selected two districts in Guangzhou and then selected a random representative sample of older clients. In the first stage, Liwan and Yuexiu districts were chosen because of the availability of administrative records and the large number of clients in each district. At the end of June 2021, the two districts provided public in-home services to 7,631 clients (475 CAC and 7,156 CDC), which accounted for nearly 40% of the in-home care clients in Guangzhou. Table 1 summarizes the

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characteristics of all districts in Guangzhou. Among the 11 districts, Liwan had a middle ranking (7th) in economic development, while Yuexiu was more economically developed. The two selected districts had relatively higher dependency ratios and percentages of older people among Guangzhou's total older population. In the second stage, random sampling methods were used to select 600 clients, with 300 using CAC and 300 using CDC.

[Insert Table 1]

Owing to the pandemic, we conducted a telephone administrated survey in Cantonese or Mandarin between August and November 2021. Each interview lasted approximately 20 to 30 minutes. To ensure data quality, we conducted a pilot survey (n = 23) and revised the questionnaire based on respondents' feedback and suggestions. A standardized protocol was formulated to train one graduate and eight undergraduate students to perform the telephone survey. Each temporarily unresponsive phone number was called up to 6 times (twice per day with an interval of at least 60 minutes for three days) in case the initial attempt was not answered. Incentives (50 CNY gifts or cash) were provided to encourage participation.

Our sample inclusion criteria were older clients aged 60 or above or their family members (spouses or other relatives) who registered as representatives of the clients. The reasons for allowing proxies to respond to the survey were the physical or cognitive incapacity of clients to communicate and the pivotal role family members play in making decisions for older clients. Also, we excluded respondents who were delivering care services but were not family members of the older clients, including domestic helpers and care workers from agencies. The overall response rate was 72.5% (n = 435), with rates for CAC (71.67%) and CDC (73.33%) respondents quite similar. After excluding 18

respondents who did not satisfy the inclusion criteria, we included 417 respondents in the analysis, with 5 (1%) older clients and 412 (99%) family members.

Measurement

Outcome

The outcome was a dichotomous variable for utilizing CDC, which is similar to the measurement in Leece's (2005) research. Home-based care encompassed CAC and CDC models, and we obtained data on service options from administrative records. Clients who used agency-assigned care workers were categorized as CAC users (coded as 0), while those who hired family members or domestic helpers were classified as CDC users (coded as 1). Previous research has identified two types of service take-up: the proportion of CDC users among home-based care users and the proportion of CDC users among clients in need of home-based services. This study focused on the former type and assumed that addressing barriers to using CDC would benefit both CAC users and those not receiving any home-based services so that CDC can be a quality option for them.

Independent variable

To explain CDC utilization, we examined six factors within three domains of behavioral economics theories: limited attention, choice overload, hassle costs, procrastination, social norms, and status quo bias. Respondents were asked to rate each of the six factors using a five-point scale, ranging from strongly disagree (1) to strongly agree (5). These variables and measurements are summarized in Table 2.

[Insert Table 2]

Limited attention was measured based on literacy about services and procedures (Montoro-Rodriguez et al., 2003). Respondents were presented with two situations: "It is

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difficult to use CDC because I do not know where to find it" and "It is difficult to use CDC because I do not know the application process." Each item was reverse coded, with a higher score indicating better knowledge about services or procedures.

The extent of respondents' choice overload was assessed by a commonly used proxy, the five-item decision regret scale, whereby higher levels of regret indicated higher choice overload (Chernev et al., 2015). Respondents reported feelings about their decisions to use CDC/CAC. Examples of questionnaire items were "I regret the choice that was made" and "I would make the same choice if I had to do it over again." These responses demonstrated acceptable internal consistency. Cronbach's alpha was 0.70.

Hassel cost was measured using items that assessed perceived barriers to using CDC (Mo & Mak, 2009). Respondents were presented with two situations: "The whole CDC application process takes a long time" and "The whole CDC application process is complicated." Cronbach's alpha for this scale was 0.80.

The pure procrastination scale assessed the likelihood of procrastination and adapted with five items (Nordby et al., 2019), including "I am continually saying I'll do it tomorrow" and "In preparing for some deadlines, I often waste time by doing other things." Higher scores indicated a higher tendency to procrastinate. Cronbach's alpha was 0.88.

We measured social norms to CDC utilization with two adapted items based on the subjective norm scale (Francis et al., 2004), which was developed to measure in a simplified way the opinions of important people on respondents' behaviors. In this study, two items were used: "Most people who are important to me think I should use CDC" and "It is expected of me that I should use CDC." Cronbach's alpha was 0.84.

We assessed respondents' status quo bias using the resistance to change scale adapted from Bhattacherjee and Hikmet (2007). Respondents were presented with four situations regarding their tendency to change clients' daily life after using home-based care, including care workers, service schedules, daily life, and relationship with the family. Cronbach's alpha was 0.64.

Covariates

Respondents' and clients' characteristics were included for their relevance to decisions on using CDC. Respondents' characteristics comprised gender, age, marital status (single/divorced/widowed or married), education attainment (below college or college and above), household income (1,000 CNY), and relation with clients (non-caregiver or caregiver). Clients' characteristics comprised gender, age, household size, the number of children, the number of physical impairments (ADLs: eating, dressing, ambulating, grooming, toileting, and continence), the diagnosis of dementia (no or yes), agency size (< 10 clients in the sample or ⩾ 10) and residing district (Liwan or Yuexiu).

Statistical Analysis

Descriptive statistics were used to depict the study sample's characteristics. Differences between CAC and CDC samples were examined using chi-square tests for categorical variables and *t*-tests for continuous variables. Furthermore, we conducted a multivariate logistic regression analysis with the sampling weight to examine the association between service utilization and behavioral economics factors. Standard errors were clustered by agency to account for correlations within each agency. To obtain standardized coefficients and compare the relative contribution of each factor, we standardized all independent variables prior to analysis (Menard, 2011). Given the potential

multicollinearity problem, variance inflation factors (VIFs) were calculated for each independent variable. A mean VIF of 1.24 indicated no evidence of multicollinearity. Associations among independent variables are presented in Supplementary Table 1. Most behavioral economics measures were intercorrelated, and the correlation coefficients (r) ranged from -0.45 to 0.18, which indicated no concerns regarding collinearity ($|r| > 0.7$) (Dormann et al., 2013). Additionally, we employed multiple imputation by chained equations to handle missing values since the Little's completely at random test showed that missing data were completely at random ($\chi^2 = 20.82$, $df = 25$, $p = 0.70$) (Li, 2013). Instead of using data after multiple imputation, we also performed a complete case analysis (n = 363), excluding observations with missing data (n = 54), and found that the results remained unchanged.

Results

Descriptive Statistics

Table 3 features the characteristics of the study sample. Male and female respondents were equally represented. The mean age of the respondents was 57 years. Approximately one-fifth of respondents were single/divorced/widowed, and two-thirds received no college degree or above. Respondents had an average household income of 8,590 CNY per month. More than half of the respondents reported being non-caregivers of the older clients.

[Insert Table 3]

Regarding the characteristics of older clients, the majority (69.30%) were female with a mean age of 82 years. On average, household size and the number of children were 3 and 3, respectively. The number of physical impairments among care clients was 5.22,

and 81.53% were not diagnosed with dementia. Only 21.10% of clients were served by agencies with less than ten clients in the study sample. The districts of residence among clients were evenly distributed.

The overall sample was split evenly between CAC (n = 205) and CDC (n = 212) clients, and the CAC comparison sample was similar to the CDC in most of the study's variables. The number of CDC clients who were served by a larger agency ($\geq$ 10 clients in the sample) and lived in Liwan district was greater than their CAC counterparts. Compared with CAC respondents, CDC respondents were more likely to report higher procedural literacy and a lower procrastination score.

Logistic Regression Results

Table 4 shows results of associations between behavioral economics factors and CDC utilization. As we measured all continuous variables in their standardized scores, the coefficients (*b*) could be interpreted as the relative importance of each factor (Menard, 2011). An initial model (Model 1) including only independent variables shows that three factors were significantly associated with CDC utilization. Respondents who reported higher procedural knowledge ($b = 0.32$, $p < .05$), higher perceived hassle costs ($b = 0.26$, $p < .01$), and perceived favourable social norms toward CDC ($b = 0.18$, $p < .01$) were more inclined to use CDC. Model 2 consisted of only covariates. The result shows that none of the characteristics (covariates) of the respondents or the clients were significantly associated with CDC utilization.

[Insert Table 4]

Model 3 (Table 4) included all covariates and independent variables, and the findings were similar to those of the first two models. Among the independent variables,

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the top three factors associated with CDC use were procedural literacy, hassle costs, and norms. Specifically, procedural knowledge was positively associated with CDC utilization ($b = 0.41$, $p < .01$), which supported hypothesis 1a. However, respondents who reported higher hassle costs were more likely to use CDC ($b = 0.26$, $p < .001$). This result contradicted hypothesis 2a. Social norms were positively related to CDC use ($b = 0.21$, $p < .05$), which supported hypothesis 3a. Following Chinn's(2000) approach, we converted the coefficients into effect size (Cohen's d) and found a modest effect size ($d \leq 0.2$) for procedural literacy ($d = 0.19$), hassle costs ($d = 0.13$), and social norms ($d = 0.13$). The remaining behavioral economics factors, i.e., choice overload, procrastination, and status quo bias, had no significant effects on CDC utilization, rejecting hypotheses 1b, 2b, and 3b, respectively.

Discussion

Based on behavioral economics perspectives, this study explored the effects of psychosocial factors on CDC utilization in Guangzhou, China. Also, the relative contribution of each barrier to accessing CDC was examined. By analyzing cross-sectional survey data using logistic regression analyses, we found three main obstacles to using CDC: procedural literacy, hassle costs, and social norms. These results highlight the directions used to integrate behavioral economics theories into interventions and policy implementation to support older adults' access to CDC.

Procedural knowledge exhibited the strongest association with CDC utilization. In Guangzhou, the government did not provide explicit guidance on application procedures, which left the duties of designing policy implementation details to street-level bureaucrats. These administrators in home-based agencies had to rely on their own discretion in the

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implementation process. Presently, applicants must navigate the system they have never interacted with and gather information about program enrolment and paperwork required by the government. The lack of information about application procedures produces learning costs and barriers to accessing CDC. Procedural knowledge can be enhanced by offering informational programs that specifically target people at the onset of impairments (e.g., hospital discharge), and information presentation can follow certain principles, such as *clarity* (making information easier to process by writing in plain, accessible language), *vividness* (making information prominent through bullets, colour coding, and purposeful highlighting), and *visualization* (using images, graphs, and videos to communicate information visually) (Baxter et al., 2008; Loewenstein et al., 2014). Moreover, promotional materials can be distributed through existing credible local administration channels, particularly the resident's committee which has direct contact with its residents. These principles of information dissemination can enhance older persons' comprehension, alleviating their stress when making decisions and supporting their efforts to make informed choices on care services.

Contrary to our hypothesis, higher hassle costs, as the second strongest behavioral economics factor, were associated with higher CDC utilization. One possible explanation is that CDC respondents had experienced more substantial burdens in the CDC application process than that expected by CAC respondents. Namely, CAC respondents may have underestimated how complex and time-consuming the application process is because they had not personally experienced it. Based on our additional qualitative interviews with care recipients and family members in Guangzhou, people who applied for CDC services, as opposed to CAC clients, were apt to perform more duties, such as completing paperwork

associated with hiring self-directed care workers, and experience more obstacles, such as undergoing long waiting times when these workers first had to pass mandatory training courses before they could officially start working. To mitigate these duties and burdens and facilitate CDC utilization, policymakers could simplify application procedures by reducing unnecessary paperwork and provide in-person aids to help complete applications, especially for those without the assistance of family members or social support (Fox et al., 2022; Herd et al., 2013; Madrian, 2014).

Social norms ranked as the third strongest factor associated with CDC utilization. In Guangzhou, public in-home care is a newly initiated program, and many older persons and family members are unfamiliar with it and, hence, with its complicated application process. People can acquire useful information through word-of-mouth or behaviors of peer groups (e.g., neighbours and co-workers of family members). Also, they may be influenced by peer pressure or make decisions to use CDC based on what other people have chosen before them (Mitchell, 2015). To better promote CDC utilization, governments and practitioners could nudge potential CDC applicants by using descriptive norms to frame messages, such as providing information about peer behaviors, e.g., "The majority of older adults like you benefited from CDC" (Loewenstein et al., 2014; Rhodes et al., 2020). This way, people's conformity to social norms can be leveraged to influence care decisions and promote CDC utilization.

However, choice overload, procrastination, and status quo bias were not significantly associated with CDC utilization. Concerning the insignificant association between CDC utilization and choice overload, one possible explanation is that family members who acted as representatives of older clients were not functionally impaired and

could process information about service options and make informed choices (Kan & Chui, 2021). Furthermore, the few available service options in Guangzhou may have nullified choice overload as a potential barrier. As for the insignificant association between procrastination and CDC utilization, our finding suggests that when facing the high-stake option of choosing an elderly care arrangement, families were not bounded by procrastination because they recognized the serious consequences of delaying their care decision. Finally, CDC utilization in Guangzhou was less affected by status quo bias. One possibility is that when seeking public in-home services, older persons or their families had already determined to change their existing situations and recognized the benefits of the program, regardless of CDC and CAC options. As choice overload, procrastination, and status quo bias had null effects on CDC utilization, policymakers in Guangzhou could optimize resources to address the other access barriers mentioned above. Nevertheless, our findings do not necessarily demonstrate that insignificant psychosocial factors are unimportant when facilitating CDC utilization in other contexts. Future studies could investigate these factors and replicate our research in different cultural and institutional settings.

This study had some limitations. First, we could not include all behavioral economics factors guided by Congdon and colleagues (2011). This study only focused on psychosocial factors most relevant to service utilization. Second, constrained by data availability, we recruited respondents in only two districts of Guangzhou, which might limit the generalizability of our findings. Third, as this study is cross-sectional, we cannot infer causal relationships between the measured constructs and CDC take-up. For instance, the positive association of hassle costs with CDC utilization may be due to clients'

experiences of having gone through CDC services rather than perceiving hassle costs themselves as affecting CDC utilization. Future research could adopt longitudinal data to investigate the effect of psychosocial barriers on CDC utilization. Lastly, while the scale of status quo bias had an acceptable level of reliability ($0.64 > 0.6$) (Taber, 2018), it cannot meet the optimal threshold (alpha > 0.7). Future research could develop more reliable instruments to measure this concept.

Notwithstanding these limitations, this study advances research on addressing barriers to accessing CDC. One primary theoretical contribution of this study is its application of behavioral economics theories to examine demand-side obstacles to CDC utilization. Instead of assuming that older persons make deliberate and rational decisions, this study highlights the complexity of human decision-making and the essential roles psychosocial factors may play in affecting CDC utilization. Additionally, this study uncovers nuances in explaining demand-side barriers to using CDC. For example, social norms play a crucial role in clients' decisions on CDC utilization, which was less emphasized in past research.

Our findings have important practical implications. We highlighted psychosocial barriers that are malleable with cost-effective interventions, such as simplification and information disclosure about peer behaviors. Their effectiveness in improving CDC utilization should be tested in future studies. Meanwhile, this study identified the relative strength of each barrier, which can inform governments and practitioners on how best to address these barriers and which ones to prioritize. To our knowledge, this is the first quantitative study to explore demand-side constraints to CDC utilization in China. The

framework established here can be tailored to contexts in many other countries to identify

and eradicate barriers to using CDC and public in-home services.

Reference

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Table 1. Characteristics of 11 Districts in Guangzhou

District	GDP per capita (1,000 CNY)	Number of older people (age ≥ 60)	Dependency ratio (%)	Percentage of older people (age ≥ 60) among Guangzhou's total older population (%)
Liwan	87.47	223,054	29.01	12.40
Yuexiu	325.11	314,277	26.79	17.46
Haizhu	114.68	284,548	26.26	15.81
Tianhe	236.02	142,400	14.09	7.91
Baiyun	59.72	184,708	16.39	10.26
Huangpu	288.58	76,408	12.73	4.25
Panyu	85.25	146,904	13.52	8.16
Huadu	101.89	123,410	14.70	6.86
Nansha	217.44	76,708	15.60	4.26
Conghua	53.67	86,908	13.38	4.83
Zengcheng	72.25	140,143	13.75	7.79
Total	135.05	1,799,468	18.27	100.00

Note. Data were retrieved from Guangzhou Statistical Yearbook 2021.

Table 2. Measures of Independent Variables

Construct	Measurement	Example questions	Cronbach's alpha
Limited attention	Service literacy (Montoro-Rodriguez et al., 2003)	It is difficult to use CDC because I do not know where to find it.	NA (Single item)
	Procedural literacy (Montoro-Rodriguez et al., 2003)	It is difficult to use CDC because I do not know the application process.	NA (Single item)
Choice overload	Decision regret scale (Chernev et al., 2015)	I regret the choice that was made; I would make the same choice if I had to do it over again.	0.70
Hassle costs	Perceived barriers to using CDC (Mo & Mak, 2009)	The whole CDC application process takes a long time; The whole CDC application process is complicated.	0.80
Procrastination	Pure procrastination scale (Nordby et al., 2019)	I am continually saying I'll do it tomorrow; In preparing for some deadlines, I often waste time by doing other things.	0.88
Social norms	Subjective norm scale (Francis et al., 2004)	Most people who are important to me think I should use CDC; It is expected of me that I should use CDC.	0.84
Status quo bias	Resistance to change scale (Bhattacherjee & Hikmet, 2007)	I would rather not change care workers/service schedules after using LTCI.	0.64

Table 3. Characteristics of Respondents (Unweighted Sample)

Variables	Full sample (n=417) Mean (SD) or n (%)[a]	CAC users (n=205) Mean (SD) or n (%)	CDC users (n=212) Mean (SD) or n (%)	p value
Covariates: respondents' characteristics				
Gender: female	248 (59.47)	115 (56.10)	133 (62.74)	
Age	56.95 (10.44)	57.52 (11.20)	56.39 (9.64)	
Marital status: single/ divorced/widowed	83 (19.90)	37 (18.05)	46 (21.70)	
Education level: below college	279 (66.91)	134 (65.37)	145 (68.40)	
Household income (1,000)	8.59 (7.09)	8.14 (4.72)	9.02 (8.74)	
Relation with client: non-caregiver	227 (54.44)	114 (55.61)	113 (53.30)	
Covariates: care clients' characteristics				
Gender: female	289 (69.30)	145 (70.73)	144 (67.92)	
Age	82.24 (9.10)	81.60 (9.32)	82.85 (8.87)	
Household size	3.27 (1.35)	3.35 (1.41)	3.21 (1.30)	
Number of children	2.55 (1.58)	2.53 (1.52)	2.58 (1.65)	
ADLs	5.22 (1.26)	5.21 (1.30)	5.22 (1.22)	
Dementia: no	340 (81.53)	164 (80.00)	176 (83.02)	
Agency size: < 10	88 (21.10)	27 (13.17)	61 (28.77)	***
District: Liwan	232 (55.64)	103 (50.24)	129 (60.85)	*
Independent variables				
Service literacy	3.66 (1.20)	3.61 (1.15)	3.70 (1.24)	
Procedural literacy	3.40 (1.20)	3.27 (1.23)	3.52 (1.17)	*
Choice overload	1.77 (0.52)	1.77 (0.50)	1.77 (0.54)	
Hassle costs	2.74 (1.11)	2.70 (1.07)	2.78 (1.14)	
Procrastination	1.79 (0.69)	1.88 (0.72)	1.70 (0.65)	*
Norms	3.55 (0.91)	3.49 (0.86)	3.61 (0.96)	
Status quo bias	3.76 (0.69)	3.79 (0.61)	3.74 (0.75)	

Note. [a] "Mean (SD) or n (%)" indicates that for continuous variables, we provided the mean and standard deviation, and for categorical variables, we presented the frequency and the proportion with the given characteristic. $*p < .05$, $**p < .01$, $***p < .001$.

Table 4. Association Between CDC utilization and Behavior Economics Factors (n = 417)

Variables	Model 1		Model 2		Model 3	
	b	*SE*	*b*	*SE*	*b*	*SE*
Independent variables						
Service literacy	0.04	0.17			0.01	0.18
Procedural literacy	0.32*	0.13			0.41**	0.14
Choice overload	0.06	0.11			0.04	0.13
Hassle costs	0.26**	0.08			0.26***	0.07
Procrastination	-0.24	0.12			-0.27	0.18
Norms	0.18**	0.06			0.21*	0.09
Status quo bias	-0.12	0.10			-0.13	0.11
Covariates: respondents' characteristics						
Gender (ref: female)			-0.21	0.24	-0.05	0.26
Age			-0.01	0.02	-0.01	0.02
Marital status (ref: single/divorced/widowed)			-0.10	0.26	-0.01	0.34
Education level (ref: below college)			-0.13	0.23	0.11	0.29
Household income			0.03	0.17	0.06	0.18
Relation with client (ref: non-caregiver)			-0.05	0.21	0.03	0.24
Covariates: care clients' characteristics						
Gender (ref: female)			0.12	0.35	0.07	0.37
Age			0.02	0.01	0.03*	0.01
Household size			-0.11	0.12	-0.15	0.14
Number of children			-0.01	0.07	-0.03	0.08
ADLs			0.04	0.12	0.11	0.11
Dementia (ref: no)			-0.10	0.33	-0.02	0.28
Agency size (ref: <10)			-0.94	0.63	-1.17	0.67
District (ref: Liwan)			-0.43	0.33	-0.5	0.36

Note. *p < .05, **p < .01, ***p < .001.