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Caregiving Across Cultures: Understanding the Interplay of Strain, Self-Perception of Ageing, and Health

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Abstract

Awareness of how caregivers see their ageing journey holds significant importance for their health and the care quality they extend. This paper intends to delve into the dynamics of cultural context, caregiving pressure, and their roles in shaping caregivers' assessments of ageing and health. The research seeks to uncover how various cultural environments shape caregivers' perspectives and beliefs regarding ageing, as well as how the pressures and challenges of caregiving may influence their health perceptions. A total of 60 spousal caregivers, whUnivero are first-generation immigrants in the UK, participated in a cross-sectional survey, consisting of 33 males and 27 females (24 White/European, 24 Chinese, and 12 Asian/Asian British). There was a moderately negative correlation between the self-perception of ageing and caregivers' strain ($r = -.55$, $p < .001$), physical symptoms ($r = -.67$, $p < .001$), and low correlation with mental health symptoms ($r = -.36$, $p < .001$). The analysis conducted through multiple regression techniques demonstrated that caregivers' stress, physical complaints, and mental health are consistent predictors of their views on ageing, with the regression equation detailing a significant share of variance in self-perception of ageing ($R^2 = .56$, Adjusted $R^2 = .53$). Cultural background significantly affects self-perception of ageing, revealing notable interactions between gender and cultural background. The General Linear Model was applied to assess the perception of ageing with gender and cultural background. A notable influence was detected, $F(2, 59) = 3.50$, $p = .05$, $\eta^2 = .32$, Observed Power = .59. Bonferroni tests conducted later suggested that the White/European group had a markedly higher self-assessment of ageing compared to the other cultural groups, with significant distinctions also apparent among the Asian/Asian British group. This study underscores the practical implications for policymakers and healthcare providers working with diverse caregiver populations. Furthermore, several strategies are proposed to enhance

support systems and resources for caregivers, which can contribute to improved health outcomes and well-being as they navigate the ageing process. [323 words]

Introduction

Perception of Ageing

Ageing refers to the biological and physiological alterations that happen throughout the years, causing variations in physical prowess, looks, and total health (Jetten et al., 2018; Ng et al., 2020; Zhou et al., 2021). Still, the concept of ageing is affected by numerous aspects, encompassing cultural expectations, unique life stories, viewed health conditions, and access to medical care (Lockenhoff et al., 2009; Pan et al., 2019; Zhou et al., 2021). The concept of self-perception of ageing (hereafter referred to as SPA) encompasses how individuals regard and navigate their own ageing experiences. This concept is vital to the ageing self, affecting numerous life aspects, including health and overall well-being. The existing literature and theoretical frameworks regarding SPA in caregivers adopt a multidimensional approach that takes into account psychological (Soskolne et al., 2007), social (Kimura et al., 2019), and cultural factors (Bilyeu, 2013; Kim & Silverstein, 2021; Kim et al., 2018). Other constructs that assess SPA include the acceptance of ageing, which is believed to play a significant role in how seniors cope with age-related transformations (Ranzijn & Luszcz, 1999; Velaithan et al., 2023). Also, SPA affects health results through three specific paths: the psychological path (where SPA-generated expectations become self-fulfilling prophecies), the behavioural path (promoting health through health-seeking practices and physical activity), and the physiological path (heightened immune function) (Levy, 2009). Individuals understand their ageing experience through SPA, especially during

significant age-related transitions, such as deteriorating health and physical function. Issues in mental health can cause a more negative self-image concerning ageing, leading to exhaustion, feelings of not measuring up, and a sense of ageing more rapidly compared to others (Gao et al., 2022; Musich et al., 2023).

Relevance for Caregivers

Caregivers hold an essential position in assisting older adults or individuals with health issues, yet they frequently encounter significant stress due to the demands of caregiving (Bom et al., 2019; Oberst et al., 1989; Pinquart & Sörensen, 2007). The act of caregiving profoundly affects both physical and mental health, which consequently influences caregivers' views on their ageing. Those who are dealing with physical health problems may perceive themselves as ageing more rapidly or becoming less competent, owing to the physical strain that caregiving imposes (Witzel et al., 2022). Research indicates that SPA affect caregivers' well-being and health outcomes, with both physical and mental health closely connected to their views on ageing (Brothers et al., 2021; Dumitrache et al., 2022; Zhang et al., 2023). SPA plays a significant role in shaping caregivers' behaviours, choices, attitudes, and their overall health status(Dionigi, 2015; Zakirov & Krasilnikov, 2020). Negative SPA among caregivers can evoke feelings of inadequacy, guilt, and the impression of being a burden, even in individuals without physical or cognitive challenges (Sun & Smith, 2017). It is also associated with perceived obstacles in providing care (Zhang et al., 2023). When caregivers fulfil their responsibilities, they might discover an evolution in their social identity (Cooper, 2021; Liu et al., 2021), consequently impacting how they view themselves in social environments (Brothers et al., 2021; Hausknecht et al., 2020). Furthermore, caregivers' SPA can impact the quality of relationships across generations,

where positive interactions enhance a more favourable self-image (Hummert, 2023). Supportive interactions and a sense of unity between generations can lead to a more affirmative SPA (Kim et al., 2023; Verma & Tripathi, 2023).

Caregivers' Age and SPA

Research is increasingly focusing on how the age of caregivers correlates with their SPA, which is a developing field within health psychology and gerontology, revealing important implications for caregiver wellness. Studies have found that caregivers' ages greatly affect their views on their own ageing journey, particularly when evaluating the specific challenges and stressors that come with caregiving tasks. Older caregivers frequently display a greater consciousness of their ageing, influenced by the physical and mental demands of caregiving, which can exacerbate feelings of fatigue, role burden, and sensitivity, ultimately causing them to have a more negative view of their ageing process (Velaithan et al., 2023). Conversely, younger caregivers may perceive their caregiving responsibilities as a transient challenge or a developmental hurdle, which could serve as a protective factor against adverse ageing perceptions and facilitate resilience (Saragosa et al., 2022). Nonetheless, younger caregivers might also confront distinctive stressors, such as the necessity to balance caregiving with professional or familial obligations, which could variably impact their perceptions of ageing. Also, research highlights that how people perceive their own ageing is closely related to their mental and physical health effects, with more positive self-perceptions connecting to enhanced well-being, lesser stress, and more proficient coping methods (Levy, 2009). Contemporary studies accentuate the bidirectional dynamics of this relationship, wherein caregiving experiences inform ageing perceptions, and these perceptions reciprocally affect caregiving practices and outcomes (Dumitrache et al., 2022; Turner et al., 2021). It is imperative to comprehend how caregiver age interacts with SPA to develop targeted interventions that support caregivers throughout their lifespan, particularly in fostering

positive ageing perceptions and alleviating the negative consequences of caregiving-related stress.

How Cultural Differences Impact SPA

Culture plays a crucial role in shaping individuals' SPA. Caregivers hailing from diverse cultural backgrounds may possess distinct viewpoints on ageing, shaped by cultural norms and expectations (Swinnen, 2023). Various cultures uphold different beliefs, values, and attitudes toward ageing, which can impact self-perceptions and, in turn, health outcomes (Chi, 2011; Twigg & Martin, 2015). A study has explored how cultural values, such as familism and collectivism, influence caregiving stress and coping strategies among diverse ethnic groups, including Latino and Asian American caregivers (Knight & Sayegh, 2010). Cultural values, such as filial piety and collectivism, influence caregiving practices and stress among Asian American caregivers (Miyawaki, 2015). Additionally, racial, ethnic, and cultural differences shape caregiving experiences, particularly regarding caregiving burden, social support, and coping mechanisms (Janevic & Connell, 2001). Recognising these cultural distinctions is vital for crafting effective interventions and support systems for older adults (Gu & Li, 2023; Wang et al., 2023). In essence, the experience of ageing is not a singular phenomenon across cultures. Elements such as family dynamics, social roles, and community support can differ greatly, influencing how ageing is viewed and experienced (Yeh, 2023). Examining these cultural differences can yield valuable insights into the varied needs and challenges encountered by seniors worldwide. Research indicates that caregiving experiences and outcomes are influenced by culture, with varying levels of burden reported among Asian and White/European caregivers (Dilworth-Anderson et al., 2002; Lai, 2007).

Implications of Gender and Culture

Gender is one of the crucial factors in understanding caregiving dynamics because it shapes roles, expectations, and experiences within caregiving contexts. Essentially, gender represents another vital element in the examination of SPA, affecting functional disability and health results (Barker et al., 2007). Gender significantly influences SPA, with women often harbouring more adverse perceptions in comparison to men. Research addressing the interplay between gender, culture, and SPA among caregivers is scarce; however, some broad insights can be gleaned from the current literature. The primary caregivers have traditionally been women, and the societal standards associated with caregiving responsibilities might affect their SPA (Turner et al., 2021; Xiong et al., 2020). The physical obstacles tied to caregiving may influence women's SPA, causing many to implement coping techniques such as pursuing social support, focusing on self-care, and nurturing resilience. (Turner et al., 2021). Conversely, male caregivers may encounter stereotypes and societal pressures regarding their caregiving role, which can likewise influence their SPA (Cohen et al., 2019). Across cultures, caregiving is often deeply gendered, with women disproportionately assuming caregiving responsibilities due to societal norms and expectations. In many East Asian cultures, caregiving is heavily gendered, with women expected to prioritise family over personal aspirations (Miyawaki, 2015). This gendered expectation can lead to higher levels of stress, role overload, and emotional exhaustion for female caregivers, who often juggle caregiving with other responsibilities like work and childcare (Cohen et al., 2021; Roden & Falzarano, 2023). Additionally, the intersection of gender and culture becomes even more complex for immigrant caregivers. Acculturation can challenge traditional gender roles, leading to conflicts between cultural expectations and the realities of caregiving in a new cultural context (Janevic & Connell, 2001).

Present Gaps in Knowledge

Grasping the concept of SPA is crucial for tackling the challenges and opportunities related to the ageing of caregivers. Nonetheless, extensive research has largely been aimed at either prosperous or disadvantaged countries, exposing a marked shortfall in examinations of cultural heterogeneity. Furthermore, there is an absence of a model that elucidates how individuals perceive and navigate their health and ageing experiences. Very few studies have explored the connection between SPA, the caregiving strains experienced by individuals, and their perceived health status. This results in a significant gap in comprehending the influence of SPA concerning caregiving strains and perceived health across various socioeconomic and cultural environments.

This project addresses the research questions on how do cultural backgrounds and gender influence caregivers' SPA, CS, PHS, and MHS, and what are the relationships and predictive associations between these variables in diverse caregiving contexts. This research objectives are to investigate (1) to examine whether there are variations in SPA, CS, PHS, and MHS between male and female caregivers, (2) to investigate the influence of cultural background on caregivers' SPA, (3) to assess whether caregiving strain differs across various cultural backgrounds, (4) to explore the relationships between SPA, CS, PHS, and MHS, (5) to understand how cultural backgrounds shape individuals' SPA, and (6) to determine whether CS, PHS, and MHS can predict SPA.

The determination of predictor and outcome variables relied on Leventhal's self-regulation approach (Leventhal et al., 1998; Leventhal et al., 2016). Leventhal's self-regulation framework, widely recognised as the Common-Sense Model (CSM), explicates the processes by which individuals identify and respond to health threats through the integration of cognitive and affective mechanisms. As detailed by Leventhal et al. (1998, 2016),

individuals formulate cognitive representations of illnesses based on five essential dimensions: identity (which includes both symptoms and diagnostic labels), aetiology, temporal development, consequences, and perceived controllability. These cognitive frameworks profoundly influence coping strategies and health-related behaviours, thus affecting self-management outcomes. The discussion reveals the complicated interactions between ideas about sickness, feelings, and the actions that follow, thereby pointing out the significance of integrating mental and emotional components in therapeutic strategies. The CSM functions as a fundamental framework for understanding how individuals interpret health-related threats and adjust their behaviours in response, thereby offering significant insights for improving illness management strategies and health-related outcomes. (Chen et al., 2009; Yan et al., 2014).

Methods

This cross-sectional survey took place during the initial meeting with the participants of the community health care service and was an integral component of a twelve-month longitudinal study focused on a group of spousal caregivers who have been providing care for their partners suffering from Alzheimer's disease.

Participants

Caregivers were recruited, by purposeful snow-ball sampling, through poster advertisements within the representative community health organisation dedicated to seniors with diverse cultural backgrounds. Participation was encouraged and voluntary to promote diversity. Written consent was subsequently obtained from all participants with the inclusion criteria as (a) spousal caregivers with no less than 3 years of caregiving experience for

support recipients diagnosed with Alzheimer's disease, (b) individuals who are aged between 60 to 80, (c) first-generation residents in the UK, (d) identifying as White/European, Chinese, or Asian/Asian British, according to the Race Equality Unit of the UK (REU, 2024), (e) proficient in understanding written English, and (f) no major physical dysfunctions. Caregivers who are not spouses (e.g., adult children, siblings, friends, or other relatives) were excluded. Additionally, caregivers who have provided care for less than 3 years were excluded, regardless of their relationship to the care recipient or other demographic factors. The decision regarding predictor and outcome variables was rooted in Leventhal's self-regulation framework (Leventhal et al., 2016), incorporating three predictors for the multiple regression evaluation, with an expected sample size of 56 calculated using G*Power (Faul et al., 2007), with the assumption that α=0.05 and power = 0.8 to obtain an estimation of total N = 56.

The Research Ethics Committee at Northumbria University approved project ID 2886, and the study was executed in compliance with the Declaration of Helsinki.

Measures

A questionnaire was developed to collect data on the variables, including SPA, PS, PHS and MHS, and background information on the gender and cultural background of the caregivers.

Self-Perceptions of Ageing (SPA)

Participants' SPA was evaluated using The Brief Ageing Perceptions Questionnaire (B-APQ)(Sexton et al., 2014) which facilitates the use of Leventhal's self-regulation model in understanding ageing perceptions, it captures multiple dimensions of ageing perceptions, including both negative (e.g., physical decline) and positive (e.g., ongoing development) aspects. This balance allows for a nuanced understanding of ageing perceptions across

cultures, where attitudes toward ageing may vary significantly. This instrument is particularly useful for extensive surveys and bolsters the model's application to SPA. This 17-item B-APQ is derived from the original 32-item Ageing Perceptions Questionnaire (APQ). It evaluates individuals' SPA across five distinct domains of ageing perception: (1) timeline chronic, (2) consequences-positive, (3) control-positive, (4) consequence and control-negative, and (5) emotional representations. The scales for negative control and consequences were reverse-coded so that higher scores reflect a more positive SPA. Cronbach's alpha for these five subscales ranges from .75 to .84. Participants articulate their agreement with every item on a scale that commonly stretches from 1 (strongly disagree) to 5 (strongly agree). The B-APQ maintains the internal consistency and construct validity of the original APQ. It corresponds accurately with the data compiled from the TILDA study, emphasizing its psychometric reliability (e.g., RMSEA = 0.04, CFI = 0.97, TLI = 0.96) (Sexton et al., 2014). The B-APQ is grounded in Leventhal's Common-Sense Model (CSM) (Leventhal et al., 2016), which is widely applicable across cultures because it focuses on universal cognitive and emotional processes in health and ageing perceptions. This theoretical foundation enhances its potential for cross-cultural use.

Caregivers' strain (CS)

Caregivers' strain (CS) in caring was measured by the Modified Caregiver Strain Index (MCSI)(Thornton & Travis, 2003). It measures multiple dimensions of caregiver strain, including emotional, financial, and social burdens, which are relevant across cultures. This multidimensional approach makes it suitable for capturing the diverse experiences of caregivers across cultures (Knight & Sayegh, 2010). Each item on the MCSI is evaluated based on the caregiver's feedback, employing a scale of 0, 1, and 2 to denote varying levels of strain experienced. The MCSI is short and easy to administer, making it practical for use in diverse cultural settings. Its simplicity reduces the burden on participants, which is

particularly important in cross-cultural research. This scale of response allows participants an easier understanding. Elevated scores on the MCSI reflect increased levels of caregiver strain. The internal reliability coefficient of .90 indicates that the tool effectively measures the strain construct consistently across diverse items, thus providing a dependable evaluation of the caregiver's experience. A two-week retest involving one-third of the caregiving sample yielded a reliability coefficient of .88, implying that the MCSI remains a stable and reliable assessment over time for long-term caregiver populations(Thornton & Travis, 2003).

Physical Health Symptoms (PHS)

The health status of caregivers was evaluated using the Physical Health Symptoms (PHS) from the Self-Rated Health (SRH) (Winter et al., 2007) which has been validated to identify physical symptoms that may stem from either somatic or psychological sources. To ensure that participants faced a manageable response burden, the checklist was condensed into 12 symptoms from its original format (Winter et al., 2007). Three symptoms: mobility-related symptoms (trouble with mobility, stiffness, or muscle soreness), cardiovascular symptoms (shortness of breath, heart pounding, tightness in chest), and gastrointestinal symptoms (poor appetite, nausea or upset stomach, constipation or diarrhoea). The group was prompted to disclose any symptoms they were facing at the point of assessment. This method facilitated an immediate capture of symptom experiences. To improve clarity for participants, a simple yes (1) or no (0) dichotomous scale was employed for participants' easier rating, with a total symptom count used to quantify symptom experience, yielding values between 0 and 7 symptoms, with an average of 0.99. The study did not provide specific details on conventional psychometric properties such as reliability or validity coefficients for the

symptom checklist. Nevertheless, the factor analysis indicates an effort to organize symptoms into meaningful categories, representing progress towards establishing construct validity.

Mental Health Symptoms (MHS)

The 21-item Depression, Anxiety, and Stress Scale (DASS-21) is a widely used self-report measure of mental health symptoms (MHS) designed to provide brief measures of depression, anxiety, and stress. There are 7 items in each of the three subscales, and the combined scores from these subscales provide a total score (Henry & Crawford, 2005). The interpretation of DASS-21 scores relies on normative data, which serves as a benchmark for assessing the intensity of symptoms. Participants rate the severity of each item on a 4-point Likert scale, ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much or most of the time). Scores that are elevated on any subscale suggest an escalation in depression, anxiety, or stress levels. The DASS-21 demonstrates good internal consistency across its subscales. The Cronbach's alpha was .88 (95% CI: .87–.89) for the Depression scale, .82 (95% CI: .80–.83) for the Anxiety scale, .90 (95% CI: .89–.91) for the Stress scale, and .93 (95% CI: .93–.94) for the total DASS-21 scale. By comparing the DASS-21 subscales with other validated measures of anxiety and depression, such as the Hospital Anxiety and Depression Scale and the Personal Disturbance Scale, the DASS-21 has been shown to possess good convergent and discriminant validity.

Research Procedures

Before distributing the questionnaire to the main study participants, a pilot group consisting of 10% of the study population (specifically, six individuals made up of two White/European, two Chinese, and two Asian/Asian British) was utilized to pinpoint any

potential issues. Feedback from these pilot participants validated the content and structure of the questionnaire, ensuring its practicality, cultural relevance, and contextual suitability. The pilot participants recommended minor modifications to the data collection protocol, such as increasing the font size of the printed questionnaires and allowing ample time for participants to read the material. These recommendations from the pilot feedback were incorporated into the main study.

During the main study, the scholar allocated the questionnaires to the designated participants following the previously outlined eligibility and disqualification standards. A research assistant was brought on board to assist and enhance participants' comprehension of the instructions while also offering any necessary clarifications.

SPSS26 For Windows was used for the statistical analyses. Bivariate correlation analysis was used to assess the strength and direction of a relationship between SPA, CS, PHS, and MHS. The linear connections among the study's variables were conveyed using the Pearson correlation coefficient (r). Multiple regression facilitated the examination of the relationship between SPA and several independent variables. For reporting the overall model fit, the coefficients R^2 and adjusted R^2 provide insights into the overall model fit, indicating how well the independent variables collectively explain variations in SPA. Finally, the General Linear Model (GLM) allows for the inclusion of both continuous (e.g., age) and categorical (e.g., cultural background, gender) variables, making it suitable for analysing how cultural environments shape SPA.

Results

Sixty spousal caregivers from the community, including 33 males and 27 females, were engaged in the study. The participants' mean age stands at 65.18 years (SD = 4.72), with a range from 60 to 78. The cultural background of the sample includes three groups: 24 White/European, 24 Chinese, and 12 Asian/Asian British. Table 1 shows the mean of SPA, CS, PHS and PHS scores by gender and culture.

Table 1

Summary statistics of key variables, according to cultural background and gender

	Cultural Background											
	White/European (n = 24)				Chinese (n = 24)				Asian/Asian British (n = 12)			
	Male		Female		Male		female		Male		female	
Variables	(n = 12)		(n = 12)		(n = 12)		(n = 12)		(n = 9)		(n = 3)	
Age	63.42	3.99	69.08	6.20	65.50	4.83	62.08	2.07	64.00	2.78	65.67	2.52
Education level	15.33	.78	13.58	2.57	11.00	2.73	9.25	1.42	11.67	2.74	11.00	5.20
Self-Perception of Ageing (SPA)	53.08	3.99	42.17	5.02	31.92	6.69	31.92	6.04	39.44	4.03	40.67	2.31
Caregivers' Strain (CS)	3.50	1.00	7.67	1.78	7.25	.87	11.42	.90	4.33	2.45	4.67	2.89
Physical Health Symptoms (PHS)	3.17	1.59	7.42	.90	8.92	1.00	9.58	.90	4.33	2.50	6.00	2.65
Mental Health Symptoms (MHS)	33.83	11.67	26.25	7.79	41.75	10.11	44.25	6.06	14.22	5.91	29.33	3.21

Difference between genders

To compare caregivers' strain and physical health symptoms between male and female participants, another independent sample t-tests were run. There was a significant difference in caregivers' strain between males (M = 5.09, SD = 2.23) and females (M = 9.02, SD = 2.83); $t(58) = -5.99$, $p < .001$. In addition, there was a significant difference in caregivers'

physical health symptoms between males (M = 5.58, SD = 3.09) and females (M = 8.22, SD = 1.72); t(58) = -3.97, p < .001. There was no significant difference in mental health between male (M=31.36, SD = 14.70) and females (M=34.59, SD = 10.97)); t(58) = -95, p > .05. Additionally, the DASS-21 in the present study demonstrated good internal consistency across its subscales. The Cronbach's alpha was .86 (95% CI: .84–.88) for the Depression scale, .82 (95% CI: .80–.83) for the Anxiety scale, .87 (95% CI: .85–.90) for the Stress scale, and .89 (95% CI: .88–.93) for the total DASS-21 scale.

The interaction between gender and cultural background

A one-way ANOVA revealed that there was a statistically significant difference in caregivers' perception of ageing between male caregivers with (F(2, 30) = 51.68, p < .001). Tukey's HSD Test for multiple comparisons found that the mean value of caregivers' perception of ageing was significantly different between White/European and Asian UK (p = .001, 95% C.I. = 11.98 to 26.36), between Chinese and Asian UK (p = .001, 95% C.I. = 8.03-19.25), and between Chinese and Asian UK (p = .001, 95% C.I. = 1.92 to 13.13), and White/European and Chinese (p = .001, 95% C.I. = 8.03 to 19.23). Moreover, there was a statistically significant difference in caregivers' perception of ageing between female caregivers with (F(2, 24) = 11.59, p < .001). Tukey's HSD Test for multiple comparisons found that the mean value of caregivers' perception of ageing was significantly different between White/European and Asian UK (p = .001, 95% C.I. = 4.79 to 15.71), between Chinese and Asian UK (p = .04, 95% C.I. = 7.13-10.12), and between Chinese and Asian UK (p = .001, 95% C.I. = 1.15 to 15.26), and White/European and Chinese (p = .04, 95% C.I. = 4.78 to 15.71).

Influence of cultural background on caregivers' SPA

A one-way ANOVA was performed to compare the effect of cultural background on caregivers' perception of ageing. A one-way ANOVA revealed that there was a statistically significant difference in caregivers' perception of ageing between at least two groups ($F(2, 57) = 38.23$, $p < .001$). Tukey's HSD Test for multiple comparisons found that the mean value of caregivers' perception of ageing was significantly different between White/European and Asian UK ($p = .002$, 95% C.I. = 2.58 to 13.16), between Chinese and Asian UK ($p = .001$, 95% C.I. = 3.26-11.25), and between Chinese and Asian UK ($p = .001$, 95% C.I. = 3.26 to 11.25), and White/European and Chinese ($p = .001$, 95% C.I. = 11.38 to 20.03)

Influence of cultural background on caregivers' strain

Another one-way ANOVA analysis was conducted to investigate how cultural background influences caregiving strain among caregivers. The one-way ANOVA revealed that there was a statistically significant difference in caregivers' perception of ageing between at least two groups ($F(2, 57) = 21.84$, $p < .001$). Tukey's HSD Test for multiple comparisons found that the mean value of caregivers' strain was significantly different between White/European and Asian UK ($p = <.001$, 95% C.I. = -5.44 to -2.06) and between Chinese and Asian UK ($p = <.001$, 95% C.I. = -6.98 to -2.85) There was no statistically significant difference between White/European and Chinese ($p= .37$).

Relationship between SPA, CSI, PHS and MHS

To explore the relationship between SPA, CSI, PHS and MHS. Bivariate correlation analysis was used to assess the strength and direction of relationships between these variables. Table 2 presents the correlation matrix of key variables of the study. The SPA had significant negative correlations with CS ($r = -.55$, $p < .01$), PHS ($r = -.67$, $p < .01$), and MHS ($r = -.36$, $p < .01$).

Table 2

Correlations among key study variables

Variables	Caregivers' Strain (CS)	Physical Health Symptoms (PHS)	Mental Health Symptoms (MHS)
Self-Perception of Ageing (SPA)	-.55**	-.67**	-.36**
Caregivers' Strain (CS)		.59**	.41**
Physical Health Symptoms (PHS)			.42**

** p < .01

How does cultural background shape SPA

A chi-square test of independence was performed to evaluate the relationship between gender and cultural background. The relationship between these variables was significant, χ^2 (2, N = 60) = 5.23, p = .03. Additionally, the General Linear Model was performed on SPA with gender and cultural background. A significant effect was observed, F(2, 59) = 3.50, p = .05, η^2 = .32, Observed Power = .59. Table 3 shows demographic variables as predictors of self-perception of ageing.

Both cultural background and gender have a strong influence on SPA (p< .05), and there are significant interactions between gender and cultural background. Further post-hoc multiple comparisons using Bonferroni tests showed that White/European had significantly higher SPA scores than the other two ethnic groups, while the differences between Chinese or Asian UK groups are significant.

Table 3.

Demographic variables as Predictors of Self-perception of Ageing

Source	Type III SS	df	MS	F	Sig	η^2	Observed Power
age	641.1	15	42.74	2.48	.09	.65	.34
Gender	140.5	1.00	140.5	1.49	.03	.44	.58
Cultural Background	1277.77	2.00	638.88	24.31***	.03	.48	.81
Gender * Cultural Background	280.50	2.00	140.25	5.34*	.02	.18	.82

How SPA is explained by CS, PHS, and MHS

The study can determine how much variance in SPA is explained by CS, PHS, and MHS, while accounting for demographic factors like age, gender, and cultural background. Using multiple regression analysis, we attempt to predict SPA using the variables of PS, PHS, and MHS (Table 4). The results showed that all three variables are good predictors of SPA, and the regression equation accounts for a significant proportion of variance in SPA (R^2 = .56, Adjusted R^2 = .53).

Table 4

Predictors of Self-Perception of Ageing

Variables	b	SE	β	t	p
Intercept	75.18	6.35		11.84	.001>
Caregivers' Strain	-.87	.34	-.30	-2.56	.01
Physical Symptom	-1.18	.40	-.36	-2.94	.001>
Mental Health	-.16	.08	-.22	-1.94	.06

Discussion

This study explored the relationship between gender, cultural background, caregiving strain, and their effects on caregivers' self-perception of ageing and perceived health conditions.

Gender

Research has indicated that women often assume caregiving roles that influence their perceptions of ageing, shaped by both societal norms and personal experiences. For women, the act of caregiving is intricately woven into their sense of self, impacting their outlook on ageing and the obstacles they encounter (Cohen et al., 2019; Penning & Wu, 2016). Meanwhile, men who are increasingly stepping into caregiving roles may transform their traditional identities and face distinct challenges as they adapt to these responsibilities (Musich et al., 2023).

Our findings evaluated female caregivers who reported poorer physical health outcomes compared to their male counterparts. This observation is consistent with existing literature indicating that female caregivers frequently report higher levels of physical strain due to longer caregiving hours and responsibilities, which ultimately leads to poorer health outcomes (Pinquart & Sörensen, 2007). Furthermore, research demonstrates a notable decline in physical functioning among female caregivers over time (Kenny et al., 2014). In contrast, male caregivers typically experience less deterioration in physical health compared to females, although they still grapple with the stresses associated with caregiving (Nijboer et al., 2001).

Our study participants, who were female caregivers, indicated experiencing greater caregiving strains than males. This observation corresponds with earlier studies that show female caregivers report higher levels of strain compared to their male counterparts (Penning & Wu, 2016). This issue can be connected to social conventions that routinely allocate caregiving roles to women, causing elevated stress and emotional challenges (Xiong et al., 2020). Consequently, female caregivers may feel a heightened sense of obligation and social pressure to deliver care, which leads to increased strain. It is common for women to be instructed to be more aware of emotional needs, potentially causing them to feel a heavier emotional weight in caregiving duties, thus increasing their stress (Hagedoorn et al., 2002). In

contrast, male caregivers may enjoy greater social backing and recognition, whereas female caregivers frequently face increased expectations and diminished acknowledgement, which leads to elevated stress levels (Zhang et al., 2006).

From a mental health perspective, caregivers display unique patterns shaped by various stressors and demographic variables. Investigations reveal that male and female caregivers alike confront serious mental health obstacles, including anxiety and depression, although these conditions may present in unique manners related to gender. Male caregivers frequently report higher instances of depression and anxiety compared to their female counterparts. They endure greater distress related to caregiving tasks, including medical and daily living assistance, experiencing more feelings of role captivity and financial strain (Roden & Falzarano, 2023). In contrast, female caregivers often report elevated anxiety levels and a diminished quality of life. Their anxiety is often exacerbated by perceived personal threats, while male caregivers' anxiety tends to be more associated with perceived risks to the care recipient (Zwar et al., 2022). Because our sample was not very large, the conclusions we reached did not completely match those in existing studies that propose gender affects mental health factors. This points out the critical requirement for a larger participant pool to authenticate these observations.

Culture & SPA

In this research, we discovered a notable difference in the perception of ageing among caregivers from various cultural backgrounds. This corresponds with earlier studies that propose that unique self-assessments of ageing could be moulded by diverse cultural elements (Dilworth-Anderson et al., 2002; Hinton et al., 2000). Cultural values, societal norms, and expectations significantly shape these perceptions. To illustrate, in Eastern Asian groups like the Chinese, Koreans, and Japanese, the belief in filial piety is well-rooted, and caregiving is

generally perceived as a responsibility and a mark of dignity (Gu & Li, 2023; Kim et al., 2018; Lin, 2023; Miyawaki et al., 2020). Caregiving is frequently perceived as a moral duty that brings pride. Consequently, caregivers may view their responsibilities as fulfilling a cultural obligation, which contributes to a more favourable self-perception of ageing. Asian caregivers often encounter considerable pressure to uphold these roles, which influences their perspective on ageing in the context of caregiving (Li et al., 2019).

Nevertheless, in this study, Chinese and Asian caregivers exhibited a less favourable self-perception of ageing when juxtaposed with their Western counterparts. This can be partially explained by Asian caregivers grappling with financial challenges and income inequality, which are intensified by their caregiving responsibilities. For instance, Korean American caregivers of dementia patients report significant financial burdens and disruptions to their employment, resulting in heightened caregiver stress (Lee et al., 2023). Immigrant caregivers frequently contend with a "double burden," as they adapt to a new culture while fulfilling caregiving roles, facing economic, linguistic, and social hurdles (Knaifel, 2022; Weng & Nguyen, 2011). Furthermore, there is a scarcity of culturally appropriate resources, including mental health support and professional assistance available to Asian caregivers, which restricts their access to essential services, potentially undermining their perception of ageing (Weng & Nguyen, 2011). Future studies should delve deeper into these socioeconomic disparities and their effects on caregiver support and perceptions.

Culture & Caregiving Strains

This research revealed notable disparities in perceived strain between White/European caregivers and their Asian counterparts, aligning with findings from a cohort of Asian dementia caregivers (Yuan et al., 2023). The experience of caregiving strain varies greatly across different cultural backgrounds, shaped by elements such as cultural identity,

acculturation, and the unique hurdles encountered by caregivers from various ethnic groups. Studies show that caregivers from culturally diverse backgrounds frequently endure elevated levels of burden and stress, which can be linked to both cultural and systemic influences (Franzen et al., 2021). Caregivers within minority ethnic populations typically deal with particular difficulties, like cultural traditions and beliefs that impact their incentives and journeys in the caregiving process (Victor et al., 2024).

Current research suggests that Asian caregivers, particularly females, might encounter further challenges including language obstacles and sparse social support, which considerably shape their caregiving experiences (Cohen et al., 2019). In addition, female providers of care, together with individuals possessing lesser educational qualifications and socioeconomic challenges, are more susceptible to facing caregiver strain (Maximiano-Barreto et al., 2022). Our findings correspond with previous studies that underline the considerable differences in caregiving challenges related to cultural backgrounds, likely affected by factors including identity, acculturation, and specific difficulties faced by caregivers from varied ethnic communities (Kim et al., 2024). Research shows that individuals providing care from varied cultural backgrounds frequently endure higher levels of stress and burden, linked to both cultural elements and systemic conditions.

Connection between self-perception of ageing, caregiving strain and culture

Our research underscored the link between self-perception of ageing and caregiving strain, aligning with findings from various other studies (Bífárìn et al., 2023; Pan et al., 2019). Elevated caregiver strain, stemming from physical, mental, emotional, and financial pressures, is linked to a perception of ageing occurring at a faster pace (Ng et al., 2020). This accumulated stress can result in a detrimental self-perception of ageing (Witzel et al., 2022). Furthermore, the experiences and strain associated with caregiving differ across cultures, with

varying levels of burden observed between Asian and White/European caregivers (Chan et al., 2023; Soskolne et al., 2007).

Intense stress from caregiving frequently results in mental health challenges such as anxiety and depression (Musich et al., 2023; Penning & Wu, 2016), which can contribute to a negative perspective on ageing, particularly among long-term caregivers who may feel inundated and view their ageing as hastened (Musich et al., 2023; Tsuda et al., 2023). In contrast, positive mental health and effective coping mechanisms can promote a more hopeful self-perception of ageing (Musich et al., 2023), as caregivers might feel more capable of handling the obstacles they encounter.

Literature indicates that mental health symptoms are intertwined with the physical health challenges faced by cancer caregivers (Kenny et al., 2014). The interrelated aspects of physical and mental health can jointly influence how caregivers view their own ageing journey (Chang et al., 2010). Experiences such as fatigue and feelings of hopelessness may cause caregivers to perceive themselves as ageing more rapidly than their contemporaries (Brothers et al., 2021). Research suggests that customized interventions that integrate mental health support along with strategies aimed at fostering positive ageing perceptions can serve to safeguard caregivers' psychological well-being. As highlighted in the literature, personalized interventions that blend mental health assistance with methods to promote positive views on ageing can help cultivate psychological resilience for caregivers (Musich et al., 2023). In this study, Asian caregivers reported notably elevated mental health symptoms in comparison to other demographic groups. This may stem from cultural expectations that prioritize family obligations, which can heighten stress and mental health difficulties (Xiong et al., 2020). Furthermore, the stigma associated with mental health in certain Asian cultures may dissuade caregivers from pursuing assistance, amplifying their distress. In this way, caregivers might find themselves less eager to look for assistance or express their challenges,

possibly causing their distress to intensify (Chou et al., 2009). The absence of a robust support system, whether due to cultural variances or limited social connections, can intensify feelings of isolation and further worsen mental health symptoms (Baumann, 2007). The predicament may be exacerbated for immigrant caregivers, as language barriers can obstruct their access to mental health services and resources, complicating their attempts to find support (Thompson et al., 2004).

The Need for Culturally Competent Caregiving Support

The societal pressure to fulfil caregiving responsibilities, often without adequate support, can lead to caregiver burnout, characterized by emotional exhaustion and a diminished sense of personal achievement (Svec et al., 2023). To address this, future efforts must prioritize the development of culturally competent caregiving practices and ensure that legal obligations are met to provide equitable care for all caregivers (Ahmed et al., 2024).

Moreover, delivering person-centred and culturally attuned support is vital, particularly for those who care for individuals with dementia. This involves recognizing cultural preferences in both decision-making and caregiving methods (Wang & Wu, 2022). Culturally tailored interventions are crucial to alleviate caregiver burden and improve outcomes for both caregivers and care recipients.

Culturally Adapted Support Program

Programs like the STrAtegies for RelaTives (START) have been successfully adapted for Black and South Asian families providing dementia care, demonstrating the effectiveness of culturally modified interventions (Webster et al., 2023). Similar adaptations can be made for other cultural groups, ensuring that the program's content, language, and delivery methods align with cultural values and caregiving practices. Furthermore, cultural and linguistic adaptations, such as the World Health Organization's iSupport program by incorporating

caregiver-led communication strategies and culturally relevant examples, can be enhanced in caregiver-led communication strategies to ensure that resources are accessible and pertinent to varied populations. For instance, iSupport had be tailored to include case studies and scenarios that reflect the experiences of caregivers from Latino, East Asian, or Indigenous communities (Messina et al., 2024). Its application can be further applied to our participants.

Culturally Adapted Interventions

Many caregivers do not self-identify as such, limiting their access to available resources. Culturally sensitive outreach is vital to raise awareness and ensure caregivers can access the support they need (Nadash et al., 2023). Culturally sensitive outreach is vital to raise awareness and ensure caregivers can access the support they need. Additionally, models involving community health workers and collaborations with trusted community and faith-based organizations can successfully engage diverse caregivers. This strategy is bolstered by evidence highlighting the significance of culturally sensitive care pathways and the urgent need for policy enhancements to tackle the specific challenges encountered by minority ethnic caregivers (Nadash et al., 2023).

Policy enhancements for equitable care

In order to effectively respond to the varied requirements of caregivers, policy advancements must emphasize culturally customized respite care, linguistic accessibility, and financial assistance. Culturally customized respite care initiatives ought to be established to honour cultural values, such as facilitating care within the caregiver's domicile or providing culturally relevant activities. These initiatives may alleviate caregiver burden while preserving cultural continuity, thereby ensuring that caregivers experience comfort and

support in their caregiving responsibilities (Nadash et al., 2023). Moreover, linguistic accessibility and translation services are indispensable for achieving equitable care. Guaranteeing that all caregiver support materials—encompassing websites, brochures, and hotlines—are accessible in various languages can markedly enhance access to essential resources for caregivers who do not speak English. Empirical studies have indicated that linguistic barriers frequently hinder minority caregivers from obtaining support services, underscoring the necessity for multilingual resources and translation services (Wang & Wu, 2022). Additionally, financial assistance for caregivers is vital, particularly for individuals from low-income or minority demographics. Policies that provide fiscal assistance, like tax breaks, stipends, or subsidies for caregiving expenditures, can alleviate the economic strain on caregivers and enable them to furnish exceptional care without endangering their own welfare (Ahmed et al., 2024). By enacting these policy enhancements, governmental bodies and organizations can establish a more equitable caregiving support framework that addresses the distinct needs of diverse populations.

The research was set up as a cross-sectional evaluation, and our conclusions came from a notably small sample size, particularly with the gender ratio being less than perfect. Furthermore, there existed the possibility of sample bias owing to voluntary participation and community-based recruitment. While this study can illustrate trends, the number of participants recruited was insufficient to adequately represent a specific ethnicity within the community. Moreover, an extended longitudinal analysis of this group of caregivers may offer additional support for the conclusions drawn. Additionally, implementing a more robust research configuration, including a mixed-methods technique with data triangulation, could aid in resolving these shortcomings, and proposals for future inquiries that engage with these topics would improve transparency. Future studies must assess how the combination of

socioeconomic factors, gender considerations, and cultural contexts influences the pressures that caregivers feel, covering emotional, physical, and financial strains, in addition to evaluating how well existing policies meet or fall short of addressing the needs of caregivers positioned at the convergence of these socioeconomic, gender, and cultural dimensions.

Conclusion

In conclusion, this study has successfully addressed its six research objectives, offering critical insights into the complex dynamics of caregiving and the roles of gender and cultural background in shaping caregivers' experiences. First, the findings reveal significant variations between male and female caregivers in SPA, CS, PHS, and MHS, with female caregivers reporting higher strain and worse physical health. This underscores the need for gender-sensitive interventions to address the unique challenges faced by women in caregiving roles (Objective 1). Second, the study highlights the influence of cultural background on SPA, with White/European caregivers reporting more positive perceptions of ageing compared to Chinese and Asian/Asian British caregivers. This emphasises the importance of culturally tailored programs that align with the values and norms of diverse cultural groups (Objective 2). Third, the analysis demonstrates that caregiving strain varies significantly across cultural backgrounds, with Asian/Asian British caregivers experiencing higher strain. This calls for targeted support to alleviate strain in culturally specific ways (Objective 3). Fourth, the study identifies strong relationships between SPA, CS, PHS, and MHS, with more positive SPA associated with lower strain and better health outcomes. These findings highlight the interconnectedness of these factors and the need for holistic approaches to caregiver support (Objective 4). Fifth, the research illustrates how cultural backgrounds shape individuals’ SPA, with significant interactions between gender and culture. This reinforces the importance of

considering both cultural and gender factors when designing interventions (Objective 5). Finally, the study demonstrates that SPA can be predicted by CS, PHS, and MHS, accounting for 56% of the variance in SPA. This provides a strong foundation for developing targeted interventions to improve caregivers' perceptions of ageing and overall well-being (Objective 6). By addressing these objectives, the study not only advances our understanding of caregiving dynamics but also provides actionable recommendations for gender-sensitive, culturally responsive, and holistic caregiving support systems. Future research should build on these findings by exploring the intersectionality of socioeconomic status, gender, and culture, as well as incorporating longitudinal and qualitative methods to deepen our understanding of caregivers' experiences over time.

Statement of ethical approval

Approval was given by the university research ethics committee with ethical approval: Project ID 2886, and the study was conducted according to the Declaration of Helsinki.

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Declaration of authors

All authors do not have any conflicts of interest to declare.

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