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Transnational Caregiving and End-of-Life in Older Japanese Americans in the United States and Japan, in Collaboration with AI (Artificial Intelligence) and Robots

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Abstract
This research examines narratives of older Japanese Americans who were over 64 years old and experienced transnational caregiving for the oldest old parents (over 79 years old) with ICT, AI (Artificial Intelligence), and robots in the U.S. and Japan. Second, the study proposes policy implications of transnational caregiving and end-of-life, in collaboration with ICT, AI (Artificial Intelligence), and robots. In-person interviews with older Japanese Americans were conducted in California. As a result of a content analysis, the research presents policy implications; 1) Develop AI (Artificial Intelligence) and robots for transnational caregiving and end-of-life; 2) Support wellness in older Japanese American transnational caregivers through AI and robots; and 3) Protect against discrimination against Asian Americans and Asians by AI and robots.

Keywords: AI (Artificial Intelligence), robots, ICT (Information and Communication Technology), transnational caregiving, end-of-life, older Japanese Americans, the oldest old parents

Ⅰ INTRODUCTION: TRANSNATIONAL CAREGIVING, ICT, AI, AND ROBOTS

1. Transnational Caregiving in Asian Immigrants in the United States and Asia

Transnational caregiving is significantly different from long-distance caregiving within the same countries, because of multi-dimensional trajectories between international migration and transnationality of care (Miyawaki & Hooyman, 2021). Transnational caregiving for older adults is defined as adult children's periodical returning to their home countries (i.e., international long-distance caregiving) and/or adult children's caregiving for their parents in their settled countries (i.e., older parents' immigration to adult children's immigrated countries) (Hoshino, 2024a). In particular, older Japanese Americans' transnational caregiving for the oldest old parents in the United States and Japan is one of the important agendas because of the serious impacts on caregivers' eight dimensions of wellness; Emotional, environmental, intellectual, physical, occupational, spiritual, social, and financial (Swarbrick, 2006).

Hoshino (2024a) revealed from semi-structured interviews with Japanese Americans in the United States and Japanese Taiwanese in Taiwan regarding translational family caregiving for older adults and wellness of transnational family caregivers. Sixty percent of Japanese Americans did not engage in transnational caregiving for their parents in Japan, however, 40% of Japanese Americans committed to transnational caregiving for their older parents in Japan. On the other hand, international migration to Taiwan was considered as pressure on Japanese Taiwanese at doubled caregiving for Taiwanese parents-in-law and Japanese older parents due to traditional family norms.

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Hoshino (2024b) also found support needs of Asian transnational care workers and real support from the assisted facilities, Asian American and Asian community-based organizations, and local/national governments in the United States and Japan. In contrast to the United States, Asian transnational care workers in Japan had to face serious challenges because the assisted facilities, Asian community-based organizations, and the national and local governments did not appropriately correspond to Asian transnational professional care workers' support needs. The Japanese national and local governments also did not develop lifelong learning programs for professional skills, leadership, and advanced Japanese language for Asian transnational professional care workers. In addition, the national and local governments needed to facilitate networking with other Asian transnational care workers so that they could settle in Japan as healthcare professionals.

2. Transnational Caregiving, ICT, AI, And Robots

Ahlin (2018) discussed that Indian women were encouraged to migrate abroad to improve the financial status of their families, while many of their parents remained in India. This is occurring in the context of a strong popular discourse of elder abandonment, related to the local norms of intergenerational co-habitation. As a result of the interview data analysis, Ahlin (2018) demonstrated that migration was a form of care practice for older adults. Moreover, caregiving for older parents continued across countries with ICT (Information and Communication Technology), and ICT had a significant role in reshaping care relations at a distance. Choudrine et al. (2021) represented new ground how humans' information processing differed from how algorithms operated on the COVID-19 and cure during the pandemic, even though AI (Artificial Intelligence) and machine learning differentiated information from misinformation. Specifically, older adults were more willing to trust traditional media rather than new media such as You Tube, etc.

AI (Artificial Intelligence) has been widely applied to healthcare. According to Bajwa et al. (2021), AI (Artificial Intelligence) can enable healthcare systems to achieve their 'quadruple aim' by a future of connected and AI (Artificial Intelligence) augmented care, precision diagnostics, precision therapeutics, and ultimately, precision medicine (Table 1). Research has rapidly accelerated with potential use across healthcare sectors such as drug discovery, virtual clinical consultation, disease diagnosis, prognosis, medication management, and health monitoring. Currently, AI (Artificial Intelligence) resembles a signal translator, translating patterns from datasets. AI (Artificial Intelligence) systems have been adopted by healthcare sectors to automate time consuming, high volume repetitive tasks and to use of AI (Artificial Intelligence) in precision diagnostics (e.g., diabetic retinopathy and radiotherapy planning).

In the medium term (the next 5-10 years), Bajwa et al. (2021) also expected development of powerful algorithms that were efficient (e.g., require less data to train), able to use unlabeled data, and to combine disparate data including imaging, health data, multi-modal, behavioral, and pharmacological data. Healthcare sectors will evolve from being *adopters* of AI (Artificial Intelligence) platforms, to becoming *co-innovators* with technology partners in the development of novel AI (Artificial Intelligence) systems for precision therapeutics.

In the long term (over 10 years), Bajwa et al. (2021) predicted that AI (Artificial Intelligence) healthcare systems would achieve a state of precision medicine through AI- augmented healthcare and connected care. Healthcare will shift from the traditional form of medicine to a preventative, personalized, data-driven disease management model that achieves improved patient outcomes in a more cost-effective delivery system.

Table 1 Widescale Adoption and Application of AI in Healthcare (Bajwa et al., 2021) *

Time line	Connected/augmented care	Precision diagnostics	Precision therapeutics	Precision Medicine	Summary
Short term: 0–5 years	Internet of things in healthcare Virtual assistants Augmented telehealth Personalized mental health support	Precision imaging (eg diabetic retinopathy and radiotherapy planning)	CRISPR (increasing use)	Digital and AI enabled research hospitals[30]	AI automates time consuming, high-volume repetitive tasks, especially within precision imaging
Medium-term: 5–10 years	Ambient intelligence in healthcare	Large-scale adoption and scale-up of precision imaging	Synthetic biology Immunomes	Customization of healthcare Robotic assisted therapies	AI uses multi-modal datasets to drive precision therapeutics
Long term: >10 years	Autonomous virtual health assistants, delivering predictive and anticipatory care Networked and connected care	Holographic and hybrid imaging Holomics (integrated genomic/radiomic/proteomic/clinical/immunohistochemical data)	Genomics medicine AI driven drug discovery	New curative treatments AI empowered healthcare	AI enables healthcare systems to achieve a

organizations (single digital infrastructure)		professionals (eg digital twins)	state of precision medicine through AI-augmented healthcare and connected care

* Timings are illustrative to widescale adoption of the proposed innovation taking into account challenges / regulatory environment / use at scale.

With regard to AI (Artificial Intelligence) for caregiving for older adults, Sophia is a human-crafted scientific character of AI (Artificial Intelligence) and robots (Hanson Robotics, 2024). She is the first robot citizen in the world and is an official ambassador for the United Nations. Designed as an assistant for physicians under the COVID-19 pandemic, Grace is equipped with sensors to help doctors diagnose illness. Specializing in senior care, she constructed talk therapy for older adults in hospitals and assisted living facilities (CNN, 2024).

Care Daily (2024) made affordable home care with a solution called AI (Artificial Intelligence) Caregiver, designed to help seniors at home and families. Care Daily (2024) addressed personal emergency response system with a more comprehensive solution. The AI (Artificial Intelligence) Caregiver incorporated a personal emergency response system and combined with three other technologies; 1) Wearable that measures vital signs and falls; 2) Passive sensors within the home; and 3) Smart speakers. The AI (Artificial Intelligence) Caregiver had bot-powered machine learning to commercially deployed services (NIA, 2024). Levenson et al. (2024) designed intervention research to determine whether the sensor-based in-home support system for caregivers of people with dementia could increase well-being of caregivers. As a result, technology significantly reduced caregivers' anxiety and improved their emotional well-being.

Ⅱ. THE PRESENT STUDY: TRANSNATIONAL FAMILY CAREGIVING FOR THE OLDEST OLD PARENTS IN THE UNITED STATES AND JAPAN

1. Objectives

The present study addresses two issues. First, this research examines narratives of older Japanese Americans who were over 64 years old and periodically returned to Japan to provide caregiving for the oldest old parents (over 79 years old) and/or who let their parents immigrate to the United States, in collaboration with ICT, AI (Artificial Intelligence), and robots. Second, the research proposes policy implications of transnational caregiving for the oldest old parents and end-of-life in older Japanese Americans with AI (Artificial Intelligence) and robots.

2. Methods

The project developed a field work for transnational caregiving for the oldest old parents, whose ages were over 79 years old, in Japanese American communities in California. The interviewees

were recruited through referrals from Executive Directors of the Japanese and Japanese American community-based organizations, Japanese American faith-based organizations, and Japanese American senior service centers in the San Francisco Bay Area. The participant criteria included: 1) The participants were over 64 years old; 2) They were born in Japan and immigrated to the United States; and 3) They have committed in transnational caregiving for their parents in the United States and Japan, including periodical returning to Japan due to caregiving and/or their parents' immigration to the United States

In-person interviews in English and Japanese with older Japanese Americans were conducted in California, and a content analysis of the interview data was conducted by the project members. This research was approved by the Committee for Protection of Human Subjects at the University of Osaka.

3. Results

(1) Participants' Demographic Variables

The participants' demographic variables are shown in Table 2. The percentage of female participants was 80%. Their age range was between the sixties and eighties. Eighty percent of the participants had current jobs. In terms of education career, 40% of the participants were high school graduates, and 40% were graduated from college and university. Twenty percent of the participants earned Graduate degree.

(2) Transnational Caregiving in Older Japanese Americans

As a result of content analysis of transnational caregiving for the oldest old parents in older Japanese Americans, 17 themes were selected (Table 3); 1) Transnational long-distance caregiving; 2) Parents' migration to the United States due to caregiving; 3) Culture of care; 4) End-of-life; 5) ICT (Information and Communication Technology), AI (Artificial Intelligence), and robots in caregiving; 6) Healthcare policies in the United States and Japan; 7) Social and workplace policies in the United States; 8) International migration to Japan; 9) International migration from Japan to the United States; 10) Effect of global migration on transnational family relationships; 11) Emotional factors; 12) Spiritual factors; 13) Financial factors; 14) Political contexts; 15) Cohort and life-cycle factors; 16) Disaster: Great Earthquake, Tsunami, and Nuclear Power Plant Accident; and 17) COVID-19 pandemic.

Table 2 Participants' Demographic Variables

Demographic Variables	Participants (N=5)
Gender (Female%)	80.0%
Age (Range)	Sixties - Eighties
Current Job (Yes)	80.0%
Education Career (%)	
High School	40%
College (2 years) / University (4 years)	40%
Graduate School	
Master Program	0%
Doctoral Program	20.0%

Table 3 Main themes of transnational caregiving in older Japanese Americans

Categories
1. Transnational long-distance caregiving
2. Parents' migration to the United States due to caregiving
3. Culture of care
4. End-of-life
5. ICT (Information and Communication Technology), AI (Artificial Intelligence), and robots in caregiving
6. Healthcare policies in the United States and Japan
7. Social and workplace policies in the United States
8. International migration to Japan
9. International migration from Japan to the United States
10. Effect of global migration on transnational family relationships
11. Emotional factors
12. Spiritual factors
13. Financial factors
14. Political contexts
15. Cohort and life-cycle factors
16. Disaster: Great Earthquake, Tsunami, and Nuclear Power Plant Accident
17. COVID-19 pandemic

Table 4 Transnational long-distance caregiving

Categories	Subcategories
1) Periodical returning to Japan due to caregiving	(1) Physical caregiving in Japan (2) Emotional support in Japan and the United States (3) Information support in Japan and the United States
2) Struggle with healthcare system in Japan	(1) Companion to city halls with the oldest old parents for access to Long-Term Care Insurance in Japan (2) Consulting with city officers on behalf of the oldest old parents in Japan
3) Cultural and social remittance	(1) Financial support for healthcare costs in Japan: Remittance (2) Delivering own success in the United States to the oldest old parents in Japan (3) Bringing culture in the United States to the oldest old parents in Japan: Cultural remittance (4) Conveying social policies, ideas, and networks in the United States to the oldest old parents in Japan: Social remittance

Each theme consisted of categories, and categories included subcategories. Transnational long-distance caregiving was found three categories (Table 4); 1) Periodical returning to Japan due to caregiving; 2) Struggle with healthcare system in Japan; and 3) Cultural and social remittance. Subcategories of 1) Periodical returning to Japan due to caregiving contained (1) Physical caregiving in Japan, (2) Emotional support in Japan and the United States, and (3) Information support in Japan and the United States. Subcategories of 2) Struggle with healthcare system in

Japan included (1) Companion to city halls with the oldest old parents for access to Long-Term Care Insurance in Japan and (2) Consulting with city officers on behalf of the oldest old parents in Japan. Subcategories of 3) Cultural and social remittance consisted of (1) Financial support for healthcare costs in Japan: Remittance, (2) Delivering own success in the United States to the oldest old parents in Japan, (3) Bringing culture in the United States to the oldest old parents in Japan: Cultural remittance, and 4) Conveying social policies, ideas, and networks in the United States to the oldest old parents in Japan: Social remittance.

Parents' migration to the United States due to caregiving selected four categories (Table 5); 1) Family reunification in the United States; 2) Struggle with healthcare system in the United States; 3) Promotion of the oldest old parents' adjustment in the United States; and 4) Healthcare disparities in the United States and Japan. Subcategories of 1) Family reunification in the United States was chosen (1) Physical caregiving in the United States, (2) Emotional support in the United States, disparities in the United States and Japan. Subcategories of 1) Family reunification in the United States contained (1) Physical caregiving in the United States, (2) Emotional support in the United States, (3) Information support in the United States, (4) Financial support for healthcare costs in the United States, (5) Hosting green cards for the oldest old parents due to caregiving, (6) Coordination travel for the oldest old parents from Japan to the United States, (7) Arranging

Table 5 Parents' migration to the United States due to caregiving

Categories	Subcategories
1) Family reunification in the United States	(1) Physical caregiving in the United States (2) Emotional support in the United States (3) Information support in the United States (4) Financial support for healthcare costs in the United States (5) Hosting green cards for the oldest old parents due to caregiving (6) Coordination travel for the oldest old parents from Japan to the United States (7) Arranging accommodation in their American houses for the oldest old parents in the United States (8) Negotiating with spouses and children to accept the oldest old parents in their American families
2) Struggle with healthcare system in the United States	(1) Purchasing private health insurance for the oldest old parents in the United States (2) Companion with the oldest old parents to city halls for access to healthcare services in the United States (3) Consulting with city officers on behalf of the oldest old parents in the United States
3) Promotion of the oldest old parents' adjustment in the United States	(1) Interpreter for the oldest old parents due to English language barriers (2) Facilitating the oldest old parents' understanding of American culture (3) Promoting the oldest old parents' social participations in American communities
4) Healthcare disparities in the United States	(1) Gaps in medical level in the United States and Japan (2) Conflicts with healthcare professionals on decision-making in the United States and Japan

Japan

accommodation in their American houses for the oldest old parents in the United States, and (8) Negotiating with spouses and children to accept the oldest old parents in their American families. Subcategories of 2) Struggle with healthcare system in the United States included (1) Purchasing private health insurance for the oldest old parents in the United States, (2) Companion with the oldest old parents to city halls for access to healthcare services in the United States, and (3) Consulting with city officers on behalf of the oldest old parents in the United States. Subcategories of 3) Promotion of the oldest old parents' adjustment in the United States were (1) Interpreter for the oldest old parents due to English language barriers, (2) Facilitating the oldest old parents' understanding of American culture, and (3) Promoting the oldest old parents' social participations in American communities. Subcategories of 4) Healthcare disparities in the United States and Japan consisted of (1) Gaps in medical level in the United States and Japan and (2) Conflicts with healthcare professionals on decision-making in the United States and Japan.

Culture of Care chose three categories (Table 6); 1) Independence; 2) Interdependence, and 3) Informal care and formal care. Subcategories of 1) Independence contained (1) Individualism, (2) Diversity in care, (3) Release from cultural beliefs of caregiving obligations, and (4) American parents-in-law's no expectation of caregiving. Subcategories of 2) Interdependence were (1) Reciprocity, (2) Intergenerational ties, (3) Traditional family norms, (4) Obligations of caregiving, (5) Filial piety, and (6) Doubled caregiving for biological parents and parents-in-law. Subcategories of 3) Informal care and formal care consisted of (1) Balance in informal care and formal care, (2) Promotion of formal care, and (3) Resistance to institutional care.

End-of-life included three categories (Table 7); 1) End-of-life of caregivers and care recipients; 2) Forgiveness; and 3) Transcendence. Subcategories of 1) End-of-life of caregivers and care Recipients contained (1) Caregiving for the oldest old parents' end-of-life, (2) Caregiving for spouses' end-of-life, and (3) Doubled difficulties facing caregivers' aging and the oldest old parents' aging, (4) Experienced deaths of other families, relatives, and close friends, and (5) Loss of family caregivers. Subcategories of 2) Forgiveness consisted of (1) The oldest old parents' appreciation for older Japanese Americans, (2) Older Japanese Americans' appreciation for the oldest old parents, and (3) Mutual appreciation between older Japanese Americans and the oldest old parents. Subcategories of 3) Transcendence chose (1) Integrity versus despair and (2) Sense of transcendence of individual life and death.

Table 6 Culture of care

Categories	Subcategories
1) Independence	(1) Individualism
	(2) Diversity in care
	(3) Release from cultural beliefs of caregiving obligations
	(4) American parents-in law's no expectation of caregiving
2) Interdependence	(1) Reciprocity
	(2) Intergenerational ties
	(3) Traditional family norms
	(4) Obligations of caregiving
	(5) Filial piety
	(6) Doubled caregiving for biological parents and parents-in-law
3) Informal care and formal care	(1) Balance in informal care and formal care
	(2) Promotion of formal care
	(3) Resistance to institutionalization

Table 7 End-of-life

Categories	Subcategories
1) End-of-life of caregivers and care recipients	(1) Caregiving for the oldest old parents' end-of-life (2) Caregiving for spouses' end-of-life (3) Doubled difficulties facing caregivers' aging and the oldest old parents' aging (4) Experienced deaths of other families, relatives, and close friends (5) Loss of family caregivers
2) Forgiveness	(1) The oldest old parents' appreciation for older Japanese Americans (2) Older Japanese Americans' appreciation for the oldest old parents (3) Mutual appreciation between older Japanese Americans and the oldest old parents
3) Transcendence	(1) Integrity versus despair (2) Sense of transcendence of individual life and death

ICT, AI (Artificial Intelligence), and robots in caregiving consisted of two categories (Table 8); 1) Utilization of ICT; and 2) AI (Artificial Intelligence) and robots. Subcategories of 1) Utilization of ICT contained (1) Online meetings with the oldest old parents' end-of-life in older Japanese Americans from the United States by Zoom (Skype, etc.), (2) Chats via smart phone video calls (iPhone face Time, etc.), (3) Emails from older Japanese Americans in the United States to the oldest old parents in Japan, and (4) Text messages from older Japanese Americans in the United States to the oldest old parents in Japan. Subcategories of 2) AI (Artificial Intelligence) and robots included (1) Healthcare AI (Artificial Intelligence) robots for information support and emotional support in the assisted facilities and (2) AI (Artificial Intelligence) chat bots for the oldest old parents and older Japanese Americans in the assisted facilities. Healthcare policies in the United States and Japan contained two categories (Table 9); 1) Hardness of healthcare policies in the United States; and 2) National healthcare policies in Japan. Subcategories of 1) Hardness of healthcare policies in the United States consisted of (1) Difficulties in healthcare policies in the United States, (2) Barriers to access to healthcare services in the United States, (3) No national health insurance in the United States, and (4) Expensive health insurance of private companies in the United States. Subcategories of 2) National healthcare policies in Japan contained (1) Challenges of understanding the elderly healthcare policies in Japan, (2) Difficulties in practicing Long-Term Care Insurance in Japan, and (3) Miscommunications with city officers on using Long-Term Care Insurance in Japan.

Social and workplace policies in the United States included two categories (Table 10); 1) Needs for support by social policies in the United States; and 2) Needs for support by workplace policies in the United States. Subcategories of 1) Needs for support by social policies consisted of (1) Needs for supportive social policies in the United States, (2) Needs for visa for transnational caregiving, and (3) Difficulties in work life balance. Subcategories of 2) Needs for support by workplace policies in the United States included (1) Needs for supportive workplace policies in the United States and (2) Needs for day off for transnational caregiving.

International migration to Japan consisted of two categories (Table 11); 1) Better life; and 2) Better job. Subcategories of 1) Better life contained (1) Earning college and graduate degrees, (2)

Obtaining professional licenses and certificates, (3) Getting money in Japan and sending money to Families as childcare and education in home countries, (4) Serving as family caregivers, (5) Getting married with Japanese nationals, and (6) Alternative success through spouses, children, and grandchildren. Subcategories of 2) Better job were (1) Establishing business and (2) Serving as professional care workers for Asians.

International migration from Japan to the United States consisted of three categories (Table 12); 1) Freedom of speech; 2) Better life; and 3) Better job. Subcategories of 1) Freedom of speech consisted of (1) Acquiring freedom and independence, (2) Making American dreams, (3)

Table 8 ICT, AI, and robots in caregiving

Categories	Subcategories
1) Utilization of ICT	(1) Online meetings with the oldest old parents' end-of-life in older Japanese Americans from the United States by Zoom (Skype, etc.)
	(2) Chats via smart phone video calls (iPhone Face Time, etc.)
	(3) Emails from older Japanese Americans in the United Stares to the oldest old parents in Japan
	(4) Text messages from older Japanese Americans in the United States to the oldest old parents in Japan
2) AI and robots	(1) Healthcare AI robots for information support and emotional support in the assisted facilities
	(2) AI chat bots for the oldest old parents and older Japanese Americans in the assisted facilities

Table 9 Healthcare policies in the United States and Japan

Categories	Subcategories
1) Hardness of healthcare policies in the United States	(1) Difficulties in healthcare policies in the United States
	(2) Barriers to access to healthcare services in the United States
	(3) No national health insurance in the United States
	(4) Expensive health insurance of private companies in the United States
2) National healthcare policies in Japan	(1) Challenges of understanding the elderly healthcare policies in Japan
	(2) Difficulties in practicing Long-Term Care Insurance for the oldest old parents in Japan
	(3) Miscommunications with city officers on using Long-Term Care Insurance in Japan

Table 10 Social and workplace policies in the United States

Categories	Subcategories
1) Needs for support by social policies in the United States	(1) Needs for supportive social policies in the United States
	(2) Needs for visa for transnational caregiving
	(3) Difficulties in work life balance
2) Need for support by workplace policies	(1) Needs for supportive workplace policies in the United States
	(2) Needs for day off for transnational caregiving

in the United States

Table 11 International migration to Japan

Categories	Subcategories
1) Better life	(1) Earning college and graduate degrees
	(2) Obtaining professional licenses and certificates
	(3) Getting money in Japan and sending money to families as childcare and education in home countries
	(4) Servings as family caregivers
	(5) Getting married with Japanese nationals
	(6) Alternative success through spouses, children, and grandchildren
2) Better job	(1) Establishing business
	(2) Serving as professional care workers for Asians

Table 12 International migration from Japan to the United States

Categories	Subcategories
1) Freedom of speech	(1) Acquiring freedom and independence
	(2) Making American dreams
	(3) Pride of own success
	(4) Taking great physical and psychological distances from Japan
2) Better life	(1) Earning college and graduate degrees
	(2) Obtaining professional licenses and certificates
	(3) Getting money in the United States and sending money to healthcare of the oldest old parents in Japan
	(4) Serving as family caregivers
	(5) Getting married with Americans and becoming American citizens
	(6) Alternative success through spouses, children, and grandchildren
3) Better job	(1) Establishing business
	(2) Serving as professional care workers for Americans

Pride of own success, and (4) Taking great physical and psychological distances from Japan. Subcategories of 2) Better life contained (1) Earning college and graduate degrees, (2) Obtaining professional licenses and certificates, (3) Getting money in the United States and sending money to healthcare of the oldest old parents in Japan, (4) Serving as family caregivers, (5) Getting married with Americans and becoming American citizens, and (6) Alternative success through spouses, children, and grandchildren. Subcategories of 3) Better job included (1) Establishing business and (2) Serving as professional care workers for Americans.

Effect of global migration on transnational family relationships consisted of four categories (Table 13); 1) Care circulation; 2) Ecological levels of care; 3) Inequity of caregiving; and 4) Geographic mobility. A subcategory of 1) Care circulation was (1) Care circulation over life course. Subcategories of 2) Ecological levels of care included (1) Multidimensional exchanges across generations, (2) Binding in reciprocal intergenerational networks of care, and (3) Transnational

constellations of unpaid and paid work of care. Subcategories of 3) Inequity of caregiving contained (1) Transfer of care from developing countries to developed countries, (2) Moral contradiction, and (3) Gendered care work. Subcategories of 4) Geographic mobility chose (1) Strengths of geographic mobility and (2) Weaknesses of geographic mobility.

Table 13 Effect of global migration on transnational family relationships

Categories	Subcategories
1) Care circulation	(1) Care circulation over life course
2) Ecological levels of care	(1) Multidimensional exchanges across generations (2) Binding in reciprocal intergenerational networks of care (3) Transnational constellations of unpaid and paid work of care
3) Inequity of caregiving	(1) Transfer of care from developing countries to developed countries (2) Morale contradiction (3) Gendered care work
4) Geographic mobility	(1) Strengths of geographic mobility (2) Weakness of geographic mobility

Table 14 Emotional factors

Categories	Subcategories
1) Sence of belonging in the United States	(1) Trust (2) Satisfactions with identity in the United States (3) Free from traditional family norms and caregiving obligations in Japan (4) Mutual support between children, spouses, and older Japanese Americans (5) Enhancement of cultural identity as Asian Americans (6) Thriving from discriminations against Asian Americans (7) Outsiders in Japan
2) Ambiguity of identity in the United States	(1) Uncertainty of identity in the United States (2) Distrust (3) Tension (4) Contest (5) Conflicts between children, spouses, and older Japanese Americans (6) Pressures from the oldest old parents' expectations of caregiving (7) Relationships of unequal power (8) Challenges of cultural identity as Asian Americans

Emotional factors included two categories (Table 14); 1) Sense of belonging in the United States; and 2) Ambiguity of identity in the United States. Subcategories of 1) Sense of belonging in the United States contained (1) Trust, (2) Satisfaction with identity in the United States, (3) Free from traditional family norms and caregiving obligations in Japan, (4) Mutual support between

children, spouses, and older Japanese Americans, (5) Enhancement of cultural identity as Asian Americans, (6) Thriving from discriminations against Asian Americans, and (7) Outsiders in Japan. Subcategories of 2) Ambiguity of identity in the United States consisted of (1) Uncertainty of identity in the United States, (2) Distrust, (3) Tension, (4) Contest, (5) Conflicts between children. spouses, and older Japanese Americans, (6) Pressures from the oldest old parents' expectations of caregiving, (7) Relationships of unequal power, and (8) Challenges of cultural identity as Asian Americans.

Spiritual factors contained three categories (Table 15); 1) Dying and death; 2) Universal perspectives; and 3) Religious factors. Subcategories of 1) Dying and death were (1) Recognition of dying processes and (2) Awareness of death. Subcategories of 2) Universal perspectives included Human history beyond individual life and death and (2) Successions of intergenerational relationships. Subcategories of 3) Religious factors chose (1) Religious beliefs, (2) Religious practices, and (3) Religious communities.

Table 15 Spiritual factors

Categories	Subcategories
1) Dying and death	(1) Recognition of dying processes
	(2) Awareness of death
2) Universal perspectives	(1) Human history beyond individual life and death
	(2) Successions of intergenerational relationships
3) Religious factors	(1) Religious beliefs
	(2) Religious practices
	(3) Religious communities

Table 16 Financial factors

Categories	Subcategories
1) Financial costs of care	(1) Financial costs of care
2) Financial costs of travel and accommodation for transnational caregiving	(1) Financial costs of travel
	(2) Financial costs of accommodation
	(3) Financial costs of childcare and education

Financial factors included two categories (Table 16); 1) Financial costs of care; and 2) Financial costs of travel and accommodation for transnational caregiving. A subcategory of 1) Financial costs of care was (1) Financial costs of care. Subcategories of 2) Financial costs of travel and accommodation for transnational caregiving contained (1) Financial costs of travel, (2) Financial costs of accommodation, and (3) Financial costs of childcare and education.

Political contexts included two categories (Table 17); 1) Political uncertainties; and 2) Political divisions. A subcategory of 1) Political uncertainties was (1) Political uncertainties. A subcategory of 2) Political divisions was (1) Political divisions.

Cohorts and life-cycle factors contained two categories (Table 18); 1) Cohort factors; and 2)

Life-cycle factors. A subcategory of 1) Cohort factors was (1) Differences in cohorts between adult children, older Japanese Americans, and the oldest old parents. A subcategory of 1) Life-cycle factors was (1) Life stages to provide caregiving for the oldest old parents.

Disaster: Great Earthquake, Tsunami, and Nuclear Power Plant Accident included two categories (Table 19); 1) Disaster destruction; and 2) Loss. Subcategories of 1) Disaster destructions consisted of (1) Historical trauma, (2) Ongoing disaster, (3) Challenges of returning to communities due to radiation, (4) Destructions of communities, (5) Fragmented social capitals, and (6) Suffering physical and mental health. Subcategories of 2) Loss contained (1) Disappearing hometowns, (2) Death of families and relatives, (3) Societal loss, and (4) Individual loss.

Table 17 Political contexts

Categories	Subcategories
1) Political uncertainties	(1) Political uncertainties
2) Political divisions	(1) Political divisions

Table 18 Cohort and life-cycle factors

Categories	Subcategories
1) Cohort factors	(1) Differences in cohorts between adult children, older Japanese Americans, and the oldest old parents
2) Life-cycle factors	(1) Life stages to provide caregiving for the oldest old parents

Table 19 Disaster: Great Earthquake, Tsunami, and Nuclear Power Plant Accident

Categories	Subcategories
1) Disaster destructions	(1) Historical trauma
	(2) Ongoing disaster
	(3) Challenges of returning to communities due to radiation
	(4) Destructions of communities
	(5) Fragmented social capitals
	(6) Suffering physical and mental health
2) Loss	(1) Disappearing hometowns
	(2) Death of families and relatives
	(3) Societal loss
	(4) Individual loss

(3) Transnational Caregiving and End-of-Life in the COVID-19 Era

As a result of content analysis of transnational caregiving for the oldest old parents in older Japanese Americans during the COVID-19 pandemic, two categories were selected (Table 20); 1) Benefits; and 2) Challenges. Subcategories of 1) Benefits contained (1) Transition in transnational caregiving, (2) Utilization of ICT (Information and Communication Technology), (3) Innovation of AI and robots, (4) Transforming from physical caregiving to advanced transnational caregiving, and (5) Surviving as Asian Americans, Subcategories of 2) Challenges consisted of (1) Shortages of

transnational professional care workers, (2) Enhancement of economic disparities, (3) Expansion of healthcare disparities, (4) Acceleration of discriminations against Asian Americans and Asians, (5) COVID-19 policies in the United States, Japan, and across the globe, (6) Travel bans and restrictions in the United States, Japan, and around the world, (7) Challenges in entering Japan, and (8) Difficulties in providing physical caregiving in Japan.

4. Discussions

As a result of a content analysis of transnational caregiving for the oldest old parents in older Japanese Americans, some older Japanese Americans developed doubled difficulties to face caregivers' aging and end of life as well as their parents' aging and end of life. They also experienced death of other family members and relatives, and it became to significant due to loss of family caregivers. In addition, they held challenges of understanding healthcare policies and Long-Term Care Insurance in Japan.

During the COVID-19 era, older Japanese Americans were unable to enter Japan due to the Japanese travel bans/restrictions and the COVID-19 policies at that time. However, older Japanese Americans could communicate with parents during end-of- life by ICT such as Zoom, even though

Table 20 COVID-19 pandemic

Categories	Subcategories
1) Benefits	(1) Transition in transnational caregiving
	(2) Utilization of ICT (Information and Communication Technology)
	(3) Innovation of AI and robots
	(4) Transforming from physical caregiving to advanced transnational caregiving
	(5) Surviving as Asian Americans by thriving from discriminations
2) Challenges	(1) Shortages of transnational professional care workers
	(2) Enhancement of economic disparities
	(3) Expansion of health disparities
	(4) Acceleration of discrimination against Asian Americans and Asians
	(5) COVID-19 policies in the United States, Japan, and across the globe
	(6) Travel van and restrictions in the United States, Japan, and around the world
	(7) Challenges in entering Japan
	(8) Difficulties of providing physical caregiving in Japan

other families in Japan couldn't enter the assisted facilities and couldn't see them. AI (Artificial Intelligence) and robots transform from physical transnational caregiving to advanced transnational caregiving.

Nedeljioco et al. (2022) gained an insight into digital literacy of older adults during the COVID-19 pandemic from the literature reviews; (1) Poor digital literacy of older adults; (2) Inequality in ICT access; and (3) Use of ICT reduces the negative impact of social isolation. They also noted that there was a large digital divide in digital literacy and competences among older adults which expanded during the pandemic, including socioeconomic status, internet access and the poor adaptation of ICT. Rapid development of remote health and social care, poor digital literacy of older adults, and the poor adaptation of ICT for older adults dictate that the problem

must be tackled systemically.

Miller et al. (2024) also represented that older adults' relationships with technology changed during the pandemic from in-depth interviews with older adults. Older adults reported benefits and positive outcomes of technology use, including social connection, work, education, and access to resources. Additionally, barriers and negative outcomes of technology use were found such as burnout, frustration, and feeling tethered to a device. These findings suggest that technology utilization may be critical in this digital era. Efforts to reduce the existing digital divide and improve technology utilization may serve to best support older adults, particularly during challenges and periods of isolation.

Moreover, Sawik et al. (2023) presented themes from focus-groups with older adults, and formal and informal caregivers concerning development of AI (Artificial Intelligence) and robots for caregiving for older adults. Both groups of older adults and caregivers expressed significant demand for robots providing broad support. Special attention must be paid to the procedure of the robot's introduction: it should be preceded by comprehensive pre-training and taking into account a range of ethical and practical issues. It is vital to involve the future robots' users in the preparation and customization of technological solutions to be introduced, following the actual needs and preferences of older adults. Both the technical environment of the robot and its functions must match the user's profile, including their priorities and the need for independence (Sawik et al., 2023). It is critical to take ethical, legal, and social issues (ELSI) of AI (Artificial Intelligence) and robots into consideration when designing interface between humans, AI (Artificial Intelligence), and robots.

Ⅲ. CONCLUSION: POLICY IMPLICATIONS OF TRANSNATIONAL CAREGIVING FOR THE OLDEST OLD PARENTS AND END-OF-LIFE IN OLDER JAPANESE AMERICANS

Finally, this research presents policy implications of transnational caregiving for the oldest old parents and end-of-life in older Japanese Americans. First, develop AI (Artificial Intelligence) and robots for transnational caregiving for older adults and end-of-life in collaboration with science, humanities, and social sciences. Second, support wellness in older Japanese American transnational caregivers through AI (Artificial Intelligence) and robots. Third, protect against discrimination against Asian Americans and Asians by AI (Artificial Intelligence) and robots.

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