Sasakawa Nursing Fellowship Progress Report 2025

Haruno Suzuki

University of California, San Francisco

School of Nursing

Department of Physiological Nursing

PhD program

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1. Overall Academic Aims at UCSF

I am reporting on my academic progress studying at the PhD program at School of Nursing, University of California, San Francisco (UCSF) fiscal year 2025. My research interests are gerontology, specifically exploring the mechanism of depression and digital technology engagement among older adults with vision impairment in my doctoral dissertation. **My Overall Academic Aims** at this PhD program are to **1) acquire rigorous research methodology**, **2) strengthen expertise in gerontology**, and **3) build multidisciplinary global collaborative network**.

2. Background

My journey into nursing began with a fascination for the intersection of clinical care and human resilience. While working as a registered nurse in a neurosurgery ward at an acute care hospital in Japan, I observed that many older patients with stroke had struggled with not only physical limitations but also psychological adaptation to their acquired disability, often leading to depression. These clinical experiences sparked my interest in understanding how older adults psychologically adapt to sensory impairment, and how psychological resilience shapes their recovery from the adversity of acquired disability, and led me to pursue my doctoral study at UCSF.

Academic Aim 1: Acquire Rigorous Research Methodology

Academic Aim 2: Strengthen Expertise in Gerontology

3. Qualifying Exam

To achieve my **Academic Aims 1 and 2**, I prepared the qualifying exam (QE) to advance as a doctoral candidate for graduating from the PhD program. QE comprises three written papers in my program: 1) systematic review; 2) theory paper; and 3) method paper. Given my ultimate goal at this program to acquire advanced methodological skillsets, I have been aiming to write all three papers as publishable for a peer-reviewed journal.

3-1. First QE Paper: Systematic Review

First QE paper, a systematic review, explored risk and protective factors associated with depressive symptoms among older adults with vision impairment. As the global population ages,

the prevalence of vision impairment and blindness is projected to reach 0.9 billion by 2050 worldwide, with a 50% increase from 2020 [1]. Depressive symptoms are a globally prevalent comorbidity among older adults with vision impairment with prevalences ranging from 25.0% to 27.0% [2,3]. While late-life depression predisposes cognitive decline and dementia [4] and substantially reduces their quality of life among older adults [5], modifiable risk and protective factors for depression remain understudied. Given these reasons, I decided to focus on the topic to examine the association between vision impairment and depression among older adults in my doctoral study. After screening approximately 15,000 citations, we identified risk factors for depressive symptoms as older age, being widowed, severe vision impairment, poor self-rated health, and greater limitations in activities of daily living (ADL) or instrumental activities of daily living (IADL). Protective factors included better adaptive coping strategies, a greater level of social support, and the use of rehabilitation services and optical aids. The findings underscore the necessity to broadly understand modifiable factors for depressive symptoms from sociodemographic, biological, physical, and psychosocial aspects to prevent and manage late-life depression. Once older adults experience acquired vision impairment due to age-related eye diseases (e.g., glaucoma, age-related macular degeneration), they generally struggle to accept vision impairment and newly adjust to disabilities in their daily life, including shopping, leisure activities, and social engagement. From the findings of the systematic review, I understand the importance to ensure the independence of older adults even those who experienced vision impairment to achieve healthy aging.

3-2. Second QE Paper: Theory Paper

Second QE paper, theory paper, mapped the key concepts for depression among older adults with vision impairment using Leximancer. Leximancer is text-mining software based on machine learning (ML) for automated conceptual mapping to uncover interconnections and patterns between concepts in unstructured text data. Leximancer helps us visualize key concepts for depression from qualitative study text data. I was awarded the intramural research grant, called “the Alpha Eta Research Award” supported by UCSF Alpha Eta Chapter of Sigma Theta Tau International, to purchase Leximancer software. After screening 6,000 qualitative study papers, several key concepts emerged in a bubble concept map using Leximancer: independence, mobility, reading, and support from family and friends. These concepts highlighted the

importance of ensuring independence, mobility functioning, visual information acquisition, and social support to prevent and manage depression among this population. While artificial intelligence (AI) has strength to quickly create a comprehensive conceptual map after feeding tons of text data, AI has some limitations, including a 'Blackbox' that AI does not explain the rationale why this output is most meaningful and the decision-making process it decided to create a conceptual map. Humans need to interpret the relevance of a bubble map to assess whether the bubble map truly illustrates the lived experience of participants, and humans need to provide the meanings for the output. From this project, I learned that human expertise is the key to understand the specific context in each study background and interpret the scientific relevance of the findings. In the future, ML-based text-mining software may help predict the risk of diseases based on patterns of patients' narrative data using electronic health records (EHRs) and describe patients' lived experience to visualize the underlying pattern of concepts using conversation data in clinical settings.

3-3. Third QE Paper: Method Paper

Third QE paper, method paper, develops and validates the digital divide scale among older adults. Digital divide refers to "inequalities in individuals' access, skills, and outcomes in using digital technology" [6]. Older adults are disproportionately less likely to have access to and use digital technology compared with younger adults [7]. The causes of low digital engagement among older adults include physical and cognitive impairment, inaccessibility of digital tools, limited digital health literacy, privacy concerns, and mistrust of digital platforms [8,9]. Given these barriers to access to digital technology, older adults are often excluded from the benefits of digital innovation in healthcare settings. Although prior studies tried to examine the association between digital divide and health outcomes [7,10], there are limited studies to comprehensively capture key constructs of digital divide that reflect the latest situation of digital technology adoption among older adults after the COVID-19 pandemic. In this project, we aim to develop and validate the digital divide scale that comprehensively captures key barriers to digital technology adoption among older adults. This scale may help identify specific barriers and guide the design of new interventions to enhance digital inclusion among older adults. Now we have been conducting literature review and refining the statistical analysis plan.

4. Next Steps: Dissertation Proposal

Upon successful completion of my QE this summer, I will make a dissertation proposal that aims to examine the long-term impact of vision impairment on depression among older adults using a nationally representative dataset. The dissertation will build on the foundation established through my three QE papers, integrating systematic evidence, conceptual frameworks, and methodological approaches to address the critical knowledge gap in gerontological research.

5. Independent Study Using HINTS Dataset

5-1. Findings: Vision Impairment and Digital Technology Use

Alongside QE papers, I have made progress in an independent study to examine the association between vision impairment and digital technology use among older adults using a U.S. national representative dataset. I analyzed the population-level data using the Health Information National Trends Survey (HINTS) [11] collected by the National Cancer Institute. I led this project independently from conceptualization to data acquisition, data analysis, and writing a manuscript. This study found that 19% of older adults with vision impairment in the U.S. have never used the Internet and 59% of them used a computer in the past 12 months, which made me deeply surprised that a substantial proportion of U.S. older adults with vision impairment remains entirely excluded from digital access. Furthermore, vision impairment was associated with lower confidence in using digital technology, and the digital technology confidence mediated between vision impairment and daily internet use among U.S. older adults, suggesting that lower confidence may be a key component to understand the mechanism why older adults with vision impairment have low engagement in digital tools.

5-2. Mechanisms of Low Digital Technology Confidence and Implications

Several factors may contribute to low digital technology confidence among older adults with vision impairment. For instance, inaccessible interfaces, including small fonts and complex navigations, may lead to cumulative operational failures and reduced self-efficacy, which may give a sense of learned hopelessness and subsequently lead to the frustration with using new digital technology. Another potential cause is the cognitive overload due to heavily relying on remembering auditory information to compensate for the loss of visual information. This high effort cost makes even minor technical troubles feel insurmountable hurdles, that may lead to

rapid burnout, referred to as 'technostress' [12]. These heavy burdens to use digital tools give them a reduced sense of autonomy and a profound sense of social exclusion in an increasingly digitized society, often resulting in the internalized ageism and ableism where individuals define their identity as an obstacle or incapable in the modern digital era. These findings underscore the urgent need for person-centered and accessible design of digital tools, such as simple interfaces and tailored digital literacy coaching programs, to foster digital technology confidence and promote meaningful digital inclusion among older adults with vision impairment.

Academic Aim 3: Build Multidisciplinary Global Collaborative Network

6. Conference Presentation and New Insights at GSA 2025

To achieve my **Academic Aim 3**, I have delivered two podium presentations at the Gerontological Society of America (GSA) Annual Scientific Meeting 2025 in Boston in November 2025, titled "A systematic review of risk and protective factors for depressive symptoms in older adults with visual impairment" [13] and "Digital confidence mediates the impact of visual impairment on daily internet use in older adults" [14]. These presentations helped me with my professional development to improve my scientific communication skills that effectively translate evidence into clinical practice and policy. I was deeply inspired by the cutting-edge gerontological research at the conference. A major highlight this year was focusing on longitudinal studies exploring modifiable risk factors for dementia through the use of biomarkers and brain images, which enhance the understanding of dementia prevention. It reinforces the idea that dementia is not an inevitable part of aging, but a challenge we can address through proactive clinical practice and policy.

Gerontology is a multidisciplinary field to understand the aging mechanism and support healthy aging for all generations. This conference emphasized how incorporating knowledge from diverse areas, such as biology, medicine, psychology, sociology, economics, engineering, and public health, allows us to create innovative solutions for complex aging issues. Furthermore, gerontologists transform the geriatric clinical practice and long-term care policies with evidence-based approaches. Gerontological research enables us to redefine aging as the multifactorial process, including adjustment, growth, and happiness, not weakness. For my own work in digital health, I gained invaluable insights into how we can better design age-friendly interfaces to enhance digital inclusion for older adults with sensory impairment. AI-driven health monitoring

and smart home programs were highlighted to help early detection of fall risks and prevent social isolation. It was a great opportunity to explore future multidisciplinary collaborations with researchers globally. I hope to bring these global perspectives back to Japan.

7. Publication at JMIR AI Regarding Human-AI Interaction

Alongside my conference presentations, my first-authored paper titled "Message Humanness as a Predictor of AI's Perception as Human: Secondary Data Analysis of the HeartBot Study" [15] was published in JMIR AI in February 2026 as part of my research residency. This study explores human-AI interaction to understand human perception of AI chatbot identity. The primary finding is that message humanness was associated with users' misinterpretation of AI-generated messages as being from a human, despite being fully AI-generated. Message humanness includes polite language, empathetic communication, and remembering prior user interactions that present characteristics making AI chatbots appear more human-like. The opportunity provided me with a broader perspective on how digital health interventions with AI chatbots can be designed to be more human-centered for diverse populations. We also discussed potential ethical concerns in designing human-like AI chatbots in healthcare contexts, including overtrust, fairness and bias, and accountability.

8. Research Assistant Project: Probiotic Adolescent Depression (PAD) study

The project that I have been working as a research assistant, called "Probiotic Adolescent Depression (PAD) study," tests the efficacy of probiotics on the left hippocampus-precuneus resting state functional connectivity (HP RSFC) and gut microbiome among adolescents diagnosed with depression. The brain-gut axis has been gathering scholarly interests from clinicians and researchers to improve the prognosis and remission of depression. I have been working on various parts of this project, such as participant recruitment, data collection, interviews, randomization, program implementation, MRI data management, stool and saliva sample management, data safety monitoring, and collaboration with multiple stakeholders, including child and adolescent psychiatrists, radiologists, and microbiologists. This project helped me understand the complexity of multifactorial determinants of depression among adolescents, from biological, developmental, psychosocial, and structural aspects with a life course perspective. It also helped broaden my academic interests grounded in biological factors

by testing biomarkers, brain images, and behavioral data to elucidate the mechanism of depression. I hope to apply these biomedical approaches for my older population to understand modifiable risk factors for depression and cognitive decline.

9. Intellectual and Personal Growth at PhD Program at UCSF

Throughout this PhD program, I was able to establish a rigorous methodological foundation using epidemiological and biostatistical approaches to understand the characteristics of depression and digital technology engagement among older adults with vision impairment. Specifically, coursework and research residency in the first and second years of my PhD study helped me develop the systematic knowledge and skills to design and conduct research independently. Furthermore, multidisciplinary collaborative opportunities helped me widen my expertise in digital health and public health perspectives, that I did not have before starting the PhD program. The PhD study at UCSF supported my intellectual and personal growth, such as promoting problem-solving skills and persistence during the challenging situations. For instance, navigating the complexity of managing multiple tasks across QE papers and independent research projects taught me to approach uncertainty with focus and optimism, even when facing anxiety about whether I could successfully get through the challenging situations. These skills and mindsets have become an irreplaceable foundation for my growth as a researcher.

10. Future Career Vision in Gerontology

Turning our attention to aging issues in Japan, vision impairment due to age-related eye diseases is a common public health issue, and the Japanese older population who experience vision impairment is projected to rapidly increase. Furthermore, Japanese older adults face significant barriers to digital technology access and use, leaving them behind in an increasingly digital world. These urgent aging issues in Japan reinforce my commitment to pursuing research that directly addresses the unmet needs of aging populations.

With the global population aging rapidly, my future career goal is to promote healthy aging for everyone. As a nurse scientist, I hope to lead longitudinal studies that identify modifiable risk and protective factors for late-life depression and cognitive decline among older adults. Beyond research, I aspire to a faculty position where I can mentor the next generation of nurses to transform policy and clinical practice through research findings. I also hope to lead

multidisciplinary, cross-national collaborations to address global aging issues. Future collaboration with my colleagues in Sasakawa Nursing Fellowship should help create new initiatives to combat aging issues in Japan. I would like to contribute to creating cutting-edge evidence to support the independence and dignity of every older adult, leaving no one behind.

11. Acknowledgement

I would like to express my deepest gratitude to the Sasakawa Health Foundation for your generous support. Your support provides me with the intellectual freedom to dedicate myself to my PhD study. By supporting my journey at UCSF, you are directly contributing to the future of gerontological research in Japan and the health of aging populations worldwide. I am committed to making a meaningful contribution by conducting cutting-edge research that brings health and dignity to older adults for generations to come. Thank you for believing in the impact of nursing science.

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