THESIS

RELATIONSHIPS BETWEEN THE WELLNESS OF OLDER ADULTS, HEALTH STATUS, PARTICIPATION, AND SOCIAL DETERMINANTS OF HEALTH: A CROSS-SECTIONAL ANALYSIS USING THE NATIONAL HEALTH AND AGING TRENDS STUDY

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Victoria Parenti

Department of Occupational Therapy

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Fort Collins, Colorado

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Master's Committee:

Advisor: James Graham

Kim Schoessow
Ray Miller

ABSTRACT

RELATIONSHIPS BETWEEN THE WELLNESS OF OLDER ADULTS, HEALTH STATUS, PARTICIPATION, AND SOCIAL DETERMINANTS OF HEALTH: A CROSS-SECTIONAL ANALYSIS USING THE NATIONAL HEALTH AND AGING TRENDS STUDY

Objectives: The primary objective of the current study is to explore the independent effects of different types of health and participation variables on subjective well-being among community-dwelling older adults. A secondary objective is to examine the roles that social determinants of health, including environmental, economic, and social factors, may play in mediating those relationships.

Data Source: The National Health and Aging Trends Study (NHATS) includes survey data from a large, nationally representative sample of Medicare beneficiaries ages 65 and older. The data capture a snapshot of later-life functioning, including information on health conditions, self-care, well-being, participation, living arrangements, and many more. NHATS data were developed for public use and have been used in more than 400 scientific publications. Participants aged 65 and older were drawn from Round 9 of NHATS conducted in 2019.

Methods: Participants were included in the final sample if they resided in the community and completed a sample person interview (no proxy person interviews were included). Main variables being assessed include the 11 items of Well-Being, hospitalizations, general self-rated health, depressive symptoms, and participation in social activities. Proxy variables from the NHATS were selected to represent the individual domains of the social determinants of health, including economic stability, education, healthcare access, social and community context, and

neighborhood and built environment. Bivariate and regression analyses were conducted to explore independent relationships and mediation effects.

Results: The data indicate that hospitalizations, self-rated health, depressive symptoms, and participation in social activities are independently associated with subjective well-being. Additionally, indicators for economic stability, education, health literacy, and community context were independently associated with well-being among the sample of Medicare beneficiaries. There was one mediating effect of an individual SDOH domain on the relationship between hospitalizations and subjective well-being after conducting the regression analysis.

Conclusion: The results from the current study contribute to a growing body of literature examining relationships between several factors and well-being outcomes for community-dwelling older adults. Data from the current study provide substantial insight on how health status, participation, and SDOH indicators can be used in future research to explore these relationships, and identify populations at risk for occupational justice or health inequities. Future research is warranted to validate measures and indicators of SDOH to further explore their relationships with health and well-being outcomes using national data sets.

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DEDICATION

For my husband, Rob, thank you for always saying the right words and for always believing in me way more than I have ever believed in myself. Thank you for making sure I ate dinner, for washing the dishes, for doing the laundry, and for completing countless other tasks at home when I was buried in my school-work or when I was too mentally exhausted to do anything. Thank you for making sure I made time for things I enjoy, for helping me through the breakdowns, and for always, always reminding me that I am capable. I know it's been a long two years of school, but I could not have done this without your continuous and unconditional love and support!

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INTRODUCTION

Addressing the health of aging older adults is becoming a pressing topic due to the growing population of older adults in the United States. In 2019, there were approximately 54 million people aged 65 and older in the U.S., and that number is projected to almost double by the year 2060 (Administration for Community Living, 2021). Healthy aging is defined as "a continuous process of optimizing opportunities to maintain and improve physical and mental health, independence, and quality of life," (Pan American Health Organization, n.d.). More older adults are aging in place, or staying in their own homes as they get older, which may warrant additional, needed support within people's homes and within their communities to support healthy aging (National Institute on Aging, n.d.). To best support the aging in place older adult population, it is important to understand the factors that influence their health, well-being, and overall quality of life.

Social determinants of health (SDOH) are the non-medical factors that influence health outcomes, and involve the conditions in which people are born, live, grow, and age (World Health Organization [WHO], n.d.[a]). Examples of SDOH include household income, education, employment, food insecurity, housing, social inclusion, and access to affordable healthcare services. These socioeconomic and structural factors are key contributors to widespread health disparities and health inequities, which are avoidable inequalities between groups of people, within countries, and between different countries (WHO, n.d.[a]). To reduce health disparities, it is important to recognize and address SDOH, which can influence the health and well-being outcomes of individuals and populations (WHO, 2016).

The Commission for the Social Determinants of Health (CSDH) was established by the WHO in March of 2005, with the purpose of achieving global health equity through addressing the socioeconomic and environmental factors leading to poor health outcomes and health disparities (CDSH, 2008). Since then, research on SDOH has steadily increased in the United States and in other countries, which has contributed to knowledge on how social factors influence health, and contributed to our understanding that widespread health issues cannot be adequately addressed by medical care alone (Bravemen et al., 2011). Currently, there are initiatives from Healthy People 2030 and respective partners that address SDOH. For instance, the Centers for Disease Control (CDC) continues to promote health initiatives to reduce health disparities related to diabetes and to prevent youth violence. The Green Carts Initiative was a launched in 2008 in New York City to increase access and availability to healthy foods and fresh produce in underserved neighborhoods (Healthy People 2030, n.d.[a]). Combating food insecurity, preventing violence and crime, and reducing health disparities through partnerships and policy changes are just a few examples of how SDOH have been addressed to improve the health and well-being of individuals and populations.

There are several frameworks used in health-related professions and educational programs that define the complex factors influencing health outcomes. The WHO's International Classification of Functioning, Disability, and Health (ICF) conceptual model is a widely used framework to measure health and disability, because it entails individual factors while also placing emphasis on societal and environmental contexts and their impacts on health (Stucki, 2005). The ICF model places three core components in the center: body functions and structures, activities, and participation. The ICF model recognizes that health condition/disease, environmental factors, and personal factors influences the other core components of functioning,

and the relationships between all variables are represented in the model with bidirectional arrows to show the interdependent relationships.

The ICF model is one of the many frameworks used in the fields of rehabilitation science and occupational therapy education to frame health and functioning as the dynamic interaction between underlying personal factors, the social and physical environment, and participation in activities, or occupations. Occupations are defined as the everyday activities that people do to occupy time and that provide meaning and purpose to their lives (AOTA, 2020). While ecological models used to frame theories and practice in occupational therapy incorporate concepts from the ICF, they emphasize occupations and the complex interactions that take place among people and the environments in which they live. The Person-Environment-Occupation-Performance (PEOP) model prioritizes occupational performance, occupational participation, and well-being as the outcome when a person interacts with their surrounding environments and contexts (Wong & Fisher, 2015). Occupational performance is defined as the "accomplishment of the selected occupation resulting from the dynamic transaction among the client, their contexts and the occupation," (AOTA, p. 8, 2020). In other words, occupational performance refers to how well the person executes the occupation within a certain context. Occupational participation is described as the "ability to act upon desired lifestyle choices to participate in meaningful and purposeful roles and activities," (Christiansen et al., 2005 as cited in Wong & Fisher, 2015).

The ICF model and PEOP model each recognize the surrounding environment as a key factor in creating both supports and barriers to occupational performance and participation in older adulthood. The environment includes multiple layers, including the immediate physical and social context in which a person lives, and the broader structural, political, and economic systems. In an older adult population, the aging process itself is a key personal factor influencing

occupational performance and participation (Stav et al. 2012). The scope and types of activities human beings can and choose to participate in change over the course of the life span due to the interaction of personal and environmental components. Occupational therapists develop client-centered interventions to address various aspects of aging with a focus on optimizing everyday function, promoting health and wellness, and empowering clients to participate in chosen daily occupations to maximize quality of life. Occupational therapists play a role in promoting health and well-being by facilitating clients' abilities to adapt and organize their daily activities into routines to prevent poor health outcomes (AOTA, 2015). Individuals and families experience many changes throughout the aging process, such as retirement, children leaving the home, moving to a new home, shifts in familial roles, and changes in health. These events can have major implications for occupational performance and participation among an older adult population. The purpose of this research project is to utilize data from the National Health and Aging Trends Study (NHATS) to examine the extent to which subjective well-being is independently associated with healthcare utilization, depressive symptoms, self-rated health, and participation, and to determine whether broader structural constructs within the environment, also known as the SDOH, partially explain those relationships.

Literature Review

Subjective well-being in older adults

According to the American Occupational Therapy Association (AOTA), well-being is described as the feeling of contentment with one's health, self-esteem, sense of belonging, security, self-determination, meaning, and roles (AOTA, 2020). Subjective well-being is generally defined by affective and cognitive judgements that people make about their lives, which are typically impacted by biological, psychological, and social factors (Wang & Kim, 2020). Ryff (2014)

developed a model for psychological well-being, which includes 6 dimensions: purpose in life; autonomy; personal growth; mastery; positive relationships; and self-acceptance. Further, the term 'well-being' can be broken down into two separate constructs, the hedonic view and eudaimonic view. The hedonic view of well-being refers to emotional responses to life events, satisfaction with one's life, and attaining pleasure. The eudaimonic view of well-being refers to the extent to which a person is functioning in an optimal way and the extent to which the individual feels their life has meaning (Ryan & Deci, 2001; Kim et al., 2016). It is clear that the concept of well-being is multifaceted; therefore, it is difficult to construct a single, all-encompassing definition. Findings from a prior factor analysis of the 11-factor well-being scale from the NHATS report that utilizing a single factor structure for measuring well-being is both a reliable and validated measure (Kim et al., 2016). During their analyses, the researchers found that hedonic and eudaimonic constructs of well-being are highly correlated, and therefore, lack discriminant validity as two separate scales of measurement. This finding suggests that elements of hedonic and eudaimonic views are interrelated with one another, for example, higher life satisfaction may be associated with a more positive affect.

Trends in well-being in older adulthood are conditional on physical, social, and biological factors that impact whether perceived well-being increases or decreases with age. The literature on well-being trends in older adults suggests that positive affect and well-being increase with age, congruent with the Socioemotional Selectivity Theory (SST). Created by Carstensen (2021), the SST is grounded in the human ability to monitor time; therefore, as time is viewed as limited, older adults tend to select and prioritize emotionally meaningful pursuits over future-oriented goals or further exploration of abilities (Carstensen, 2021; Mahlo & Windsor, 2021). The assumptions from the SST are generated from the idea that when future time perspective is

viewed as limited (typically in older adult populations) more emphasis is placed on building close relationships and valuing present-moment emotional states (Carstensen, 2021).

Sadeh et al. (2020) found that higher reported psychological well-being and social well-being are associated with significantly slower decline in physical function of older adults over a 12-year follow up period. Additionally, a meta-analysis examining the impact of subjective well-being on objective health outcomes concluded that well-being can affect short-term and long-term health outcomes and mitigate the decline of chronic diseases (Howell et al., 2007). They noted that the probability of living longer increases by 14% for individuals with reports of high well-being compared to those with low well-being (Howell et al., p. 117, 2007). Ryff (2014) conducted a review of the literature exploring factors related to hedonic and eudaimonic well-being. Among older adult populations, Ryff (2014) found that frailty in old age and subjective aging have been strongly linked to well-being. Moreover, participation in religious activities and volunteer activities were linked to subjective well-being of older adults. As patterns for healthcare provision in the U.S. shift to focus on preventative medicine and primary care, it is important to examine the effects of biopsychosocial elements of daily living and other determinants of health on long-term health and well-being outcomes.

Healthcare utilization and hospitalizations

According to the Center for Medicare & Medicaid Services (CMS), total hospital expenditures grew 6.2% and hospital care accounted for a third of total U.S. healthcare spending in 2019 (Center for Medicare & Medicaid Services [CMS]). Zisberg et al. (2015) examined the relationship between hospital stay and functional decline in older adults. They collected admission data from participants regarding their current functional status and their functional status two weeks prior to admission. Participants were then surveyed during their stay regarding

mobility, continence care, and nutritional intake. Immediately post-discharge, participants reported their satisfaction with their hospital stay and current functional status. In addition, they collected follow up data 1-month post-discharge on current functional status and rehospitalization status. They found that hospitalization was directly related to post-discharge functional decline. This study provides insight on the relationship between hospitalizations and functional status, with the assumption that a higher number of hospital stays may be related to progressive functional decline.

New research is emerging about Post-Intensive Care Syndrome (PICS), which is a term used to describe new or worsening physical, cognitive, or mental health conditions that arise after critical illness and extend beyond discharge from an acute care hospital (Rawal et al., 2017). Physical limitations, such as intensive care-related muscle weakness, and mental illness, including depression, anxiety, and post-traumatic stress, are common conditions that persist long-term among patients experiencing PICS (Inoeu et al., 2019). Experiencing mental illness or physical limitations can have impacts on occupational performance and participation in daily activities.

A meta-analysis investigated the relationship between general self-efficacy and receipt of health care services among older adults (Whitehall et al., 2019). They found that older adults receiving care were at greater risk of experiencing lower self-efficacy, and that older adults receiving care at an inpatient acute setting were more likely to experience lower self-efficacy than participants receiving care at other settings. Self-efficacy refers to an individual's belief and confidence in his/her capacity to perform certain tasks or actions (American Psychological Association, n.d.). The study by Whitehall et al. (2019) provides insight on how recent hospitalizations impact older adults' perceptions of their capabilities to perform valued activities

of daily living. A recent integrative review studied the psychological well-being effects of hospitalizations, including the effects of a first-time admission, length of stay, and readmission (Alzahrani, 2021). The researchers found seven studies that indicated the process of being admitted to the hospital for the first time may result in negative implications for the patients' emotional and psychological well-being. Additionally, they found a longer length of stay and hospital readmissions tended to have negative impacts on cognition, emotions, and depression and anxiety symptoms. Stav et al. (2012) provide evidence that participation in occupations and activities improves the health and quality of life for older adults. When participation is limited by recent hospitalization or health condition, it could have serious implications for healthy aging and the overall well-being of older adult patients.

Self-rated health

Perceived health or self-rated health is a subjective measure of how an individual views the current state of his or her health. The literature supports associations between perceived health and health outcomes, including quality of life and well-being. Findings from Lee et al. (2021) demonstrated that self-rated health is significantly associated with life satisfaction and quality of life among older adults with Parkinson's Disease. De Oliveira et al. (2020) found decreased self-rated general health status was associated with lower health-related quality of life among institutionalized older adults. Similarly, Anderson et al. (2019) found that lower self-rated general health was associated with higher self-reported nutrition-related needs and transportation-related needs among Medicare beneficiaries. An earlier study also found that perceived health is positively associated with subjective well-being among a sample of community-dwelling older adults (Humboldt et al., 2015). Whitehead and Blaxton (2020) conducted a survey study, using daily diaries and a global questionnaire, examining the

associations between aging perceptions, perceived health, and perceived stress among older adults. They found that days where participants reported higher perceived health were associated with lower perceived stress levels. The findings presented from each of these studies provides insight on how perceived health status can impact quality of life, well-being, and daily functioning among an older adult population.

Rhee et al. (2020) conducted a study examining social determinants of health (SDOH) risk patterns among older adults and whether those patterns are associated with perceived health condition, functional limitations, and health services utilization. The eight risk factors were low educational attainment, poverty-to-income ratio, food insecurity, depression, recent tobacco use, potential alcohol abuse, low physical activity, and lack of a partner. They found that older adults who reported three or more SDOH risk factors were more likely to rate their health as poorer compared to older adults who reported less SDOH risk factors. Stephan et al. (2016) used NHATS and Midlife in the United States (MIDUS) survey data to examine the association between subjective age and hospitalizations, as well as the extent to which chronic conditions and depressive symptoms accounted for the relationship. The authors define subjective age as how old or young people feel relative to their chronological age. The results showed strong evidence that an older subjective age at baseline indicated a higher risk of hospitalization, and disease burden and depressive symptoms accounted for part of that relationship (Stephan et al., 2016). The findings from the above studies provide examples of the different factors that may play a role in defining self-rated health status among older adults. Additionally, these findings provide insight on the relationship between subjective well-being and several health indicators, including perceived health and hospitalizations.

Depressive symptoms

Depression can vary in its features and severity, however, people experiencing depressive symptoms are more likely to experience comorbid pain or physical illness; decreased physical, social, and role functioning; and disruptions in daily routines (Brown, Stoffel, Muñoz, 2019). Depression is also associated with frailty and disability in community-dwelling older adults, and the negative effects of psychological well-being on health outcomes is often mediated by depressive symptoms in this population (Rao et al., 2016). Cramm et al. (2012) examined the relationship between self-management abilities, well-being, and depression among recently hospitalized older adults. The authors found that all self-management abilities were significantly associated with well-being but having a positive frame of mind was most significantly associated with symptoms of depression (Cramm et al., 2012). These findings suggest the relationship between depressive symptoms and emotional affect, which refers to the hedonic construct of well-being, may be significant among older adults. Similarly, a multi-cohort design study showed that resilience and depression are significantly associated with self-rated successful aging with an effect size comparable to that of physical health (Jeste et al., 2013). Additionally, Zahuranec et al. (2017) examined the association between activity limitations and subjective well-being after stroke in an older adult population. The researchers found that activity limitations were not predictive of well-being after accounting for other factors, including pain, depressive symptoms, and restricted participation in valued activities. Their findings suggest that depression and activity restrictions due to health limiting variables are strongly associated with subjective well-being.

Participation

Participation is described as the engagement in desired and meaningful activities in ways that are personally satisfying and congruent with cultural expectations (AOTA, 2020). The concepts of activity and participation are central to the ICF model as factors related to overall health and functioning. There are many factors that influence the level of participation and the types of productive activities that older adults choose to engage in. Sociodemographic, health, and environmental factors all play a large role in older adult participation in productive activities, specifically, driving is a significant factor influencing participation in activities outside the home (Marfeo & Ward, 2020). Homebound and semi-homebound older adults placed strong value in community participation, and experienced both health-related and transportation barriers to these activities compared to non-home bound individuals (Szanton et al., 2016).

An earlier systematic review summarized the relationship between occupational engagement and health outcomes among community-dwelling older adults (Stav et al., 2012). They found consistent evidence linking participation in productive activities such as work or volunteering, physical activities, leisure, and social activities to positive health outcomes and improved quality of life. Specifically, they found strong evidence linking engagement in work or volunteer activities to improved mental health outcomes, lower levels of depression, and greater life satisfaction. Additionally, social activities were linked to a decrease in the decline of cognitive and physical health. Chi et al. (2021) used data from the National Study of Daily Experiences (NSDE) Refresher to examine how engagement in prosocial activities impacted the well-being of young adults, middle-aged adults, and older adults. They defined prosocial activities as voluntary tasks intended to benefit someone else, such as volunteering in the community or providing emotional support to a friend or family member. They found that older

adults experienced significantly less negative affect when they engaged in more volunteering relative to days where they engaged in less volunteering. In addition, older adults who provided more emotional support during the day experienced a higher number of daily positive events. Collectively, it is clear that participation in productive activities, such as volunteering, and social activities for personal well-being is positively associated with subjective well-being among older adults (Sagherian et al., 2021) (Fekete et al., 2020). Sagherian et al. (2020) used NHATS data to examine the impact of paid work and volunteering on the subjective well-being of older adults. They found that older adults who regularly engaged in physical activity, volunteering, and social activities had significantly increased subjective well-being compared to engagement in paid work. The findings from this study support the findings from Stav et al. (2012) and glean insight on viable NHATS variables that capture the benefits of participation among older adults.

The SST explores the tendency for adults to place significant value in personal relationships, meaning, and connectedness as they grow older (Carstensen, 2021; Mahlo & Windsor, 2021). An important aspect of participation is individual meaning and the motivation to participate in certain activities. An additional finding from Stav et al. (2012) is participation in valued activities can serve a variety of needs for older adults. For example, they state, "for one person, the main focus of volunteering may be to have more social participation, and another person may volunteer for religious reasons," (Stav et al., p. 305, 2012). This supports the concept of occupations having different personal meanings and purposes for individuals. Categorizing participation as "meaningful" is an important theme in the field of occupational science. Matuska and Christiansen (2008) discuss meaning as central to occupational participation and includes all the subjective appraisals of events in our lives, significance attributed to activities, and the underlying personal identity that is created and supported by participation in activities (p. 13).

Hammel et al. (2008) conducted a qualitative study for individuals with disabilities. A common theme discussed among participants was "active and meaningful engagement/being a part of," which entailed the concept of participation as highly personalized to each individual's needs, preferences, and available resources. Another theme from Hammel et al. (2008) was "control and choice," meaning that participants strongly associate participation with a sense of personal power. Decreased access or opportunities for social engagement and valued activities among older adults may further impact health, wellness, and overall quality of life.

Social determinants of health

SDOH are defined as the structural determinants or conditions in which people are born, grow, live, and age, and include factors such as socioeconomic status, education, social supports, and the physical environment (Heimann & Artiga, 2015). The structural factors that exist, including broader institutional contexts and public policies, shape resource distribution across society and people's social position within a community, which directly impact working conditions, access to food, transportation, and healthcare, and form the circumstances of people's daily lives (Alderwick & Gottlieb, 2019). The interaction of these non-medical factors influences the daily patterns and routines that shape peoples' lives and, in turn, have complex effects on overall health. Bravemen, Egerter, and Williams (2011) differentiate between upstream and downstream social determinants of health. Upstream social determinants of health refer to the fundamental causes that are distant from health outcomes, including economic and social resources, and living conditions of communities. Downstream social determinants of health refer to factors that are proximal to health outcomes, including health-related behaviors and access to medical care, and are influenced by the upstream determinants of health. The Centers for Disease Control (CDC) and Healthy People 2030 identify the five domains of SDOH: Economic stability, education

access and quality, healthcare access and quality, neighborhood and built environment, and social and community context (CDC, 2021) (Healthy People 2030).

The CDC describes economic stability as the connection between an individual's or families' financial resources, including income, cost of living, and socioeconomic status, and their health and well-being (CDC, 2021). This domain of SDOH includes key issues surrounding poverty, employment, food insecurity, and housing. A prospective study examined the association between socioeconomic position and health outcomes over nearly three decades and found that mean income was positively and strongly associated with psychological well-being (Kaplan et al., 2008). Food insecurity is defined as the struggle to access, obtain, and manage food resources, which is one of the most detrimental consequences of poverty (Schmelzer & Leto, 2018). A cross-sectional study conducted in Ghana in a low-income region found that older adults experiencing moderate to severe hunger reported significantly increased psychological distress compared to those who were not experiencing hunger (Gyasi et al., 2021). In addition, housing instability is characterized by numerous challenges, including having trouble paying rent, moving frequently, overcrowding, moving in with relatives, or spending a majority of household income on housing payments (Healthy People 2030, n.d.[b]). A secondary data analysis from the National Survey of American Families found high rates of housing instability and food insecurity among a nationally representative sample of older adults, and reported strong associations between housing stability, food insecurity, and barriers to regular healthcare access and increased utilization of acute care hospital services (Kushel et al. 2005). Health disparities tied to socioeconomic status, including access to healthcare, healthy food, stable housing, and opportunities for physical activity, mean that individuals and families who live below the poverty threshold are more susceptible to preventable chronic diseases (Healthy People 2030).

Education access and quality refers to the connection between education and health and well-being, and includes aspects of educational attainment, such as high school graduation, higher education, language and literacy, and early childhood education (CDC, 2021). According to Hahn & Truman (2015), basic education is vital for improved health outcomes, because it provides "the ability to reason, emotional capacities of self-awareness and emotional regulation, and skills of social interaction," (p. 3). In addition, healthcare access and quality refers to the connection between individual's and families' access to health services and understanding of healthcare as it pertains to their own health (CDC, 2021). This domain includes key areas, such as access to primary care, health literacy, and health insurance coverage. An earlier focused review evaluated the efficacy and quality of primary care services for patients and found primary care to be associated with increased access to healthcare services, improved health outcomes, and decreased use of acute care hospital services (Shi, 2012). A cross-sectional regression analysis explored the mediating effect of health literacy on the relationship between sociodemographic characteristics and self-rated health, and researchers found health literacy significantly mediated relationships between both racial/ethnic disparities and self-rated health, and education disparities and self-rated health among a nationally representative sample of adults (Bennett et al., 2009). Prus (2011) conducted a comparative analysis using data from The Joint Canada/United States Survey of Health (JCUSH) and found that education was strongly associated with self-rated health in the U.S., specifically, those who received high school education or less were more likely to rate their health as poor compared to those who received post-secondary education. The researchers also found strong mediating effects of socioeconomic status on the relationship between sociodemographic characteristics and self-rated health outcomes. A mediation analysis by Yamashita et al. (2018) showed that health literacy skills and

literacy activities significantly mediated the relationship between educational attainment and self-rated health on a nationally representative sample of adults. It is widely recognized that access to quality educational attainment can lead to improved health through increasing healthy behaviors and health knowledge to empower individuals to make informed, health-related decisions for themselves and their families (Bravemen et al., 2011; Hahn & Truman, 2015).

Social and community context describes people's interactions with family, friends, co-workers, and community members, and includes relevant topics such as social cohesion and civic participation (Healthy People 2030). Related to the social and community context, the neighborhood and built environment domain refers to the connection between the environment in which a person lives and their health and well-being (CDC, 2021). This includes a wide range of topics such as quality of housing, access to transportation, availability of healthy foods, air and water quality, and prevalence of crime and violence. The social and physical aspects of neighborhoods and community contexts in which people live may pose challenges that people can't control, such as dangers to safety or discrimination (Healthy People 2030). A cross-sectional analysis from the Netherlands explored the relationships between individual social capital and neighborhood social cohesion on the well-being of older adults (Cramm et al, 2013). The researchers found social cohesion and social capital (i.e., support from indirect ties and membership or belonging within neighborhoods) were strongly associated with the self-reported well-being of older adults. Qin et al. (2020) describe neighborhood social cohesion as the state of trusting network of relationships within a community, shared values and norms, collective efficacy, and community support, in alliance with the Social Capital Theory (p. 2). On the contrary, they describe neighborhood physical disorder as the conditions and appearance of the surrounding environment, which may contribute to older adults' perceptions of the safety of their

neighborhood (Qin et al., 2020). Zhang et al. (2021) analyzed survey data among a sample of community-dwelling older adults in Hawaii to explore relationships between neighborhood conditions and psychological well-being. The researchers found that both physical neighborhood conditions and social cohesion were independently associated with well-being, and those relationships were stronger when applied together in the analyses, which suggests that the two are interrelated (Zhang et al., 2021). Qin et al. (2020) used NHATS data to examine how neighborhood social cohesion and physical disorder predict ADL and IADL limitations and found better social cohesion predicted less limitations in both ADLs and IADLs; however, neighborhood physical disorder only predicted IADL limitations and was not associated with ADL limitations. They concluded this may be due to most ADLs being performed in a private space, whereas most IADLs are performed within the community (Qin et al., 2020). A mixed methods systematic review explored associations between the physical, social and service environment and well-being of community-dwelling older adults living in urban areas (Padeiro et al., 2022). They found consistent evidence for natural spaces, accessibility of local spaces and transit, and a sense of community were associated with well-being of older adults. The findings from this study provide insight on how the social and physical aspects of our communities may impact overall health and well-being for older adults.

The social, economic, and environmental factors that lie beyond our control can impact our daily activities and routines that are necessary to achieve optimal health, well-being, and quality of life. Engelberg Anderson et al. (2020) examined the relationship between potential health-related social needs and several perceived health and well-being outcomes in a representative sample of community-dwelling older adults. They found high prevalence of at least one or more potential health-related social needs, which they defined as financial needs,

housing, nutrition, social isolation, and transportation. Additionally, significant associations between social needs existed with at least one health and well-being outcome. Inaccessibility to resources, such as healthy foods, transportation, and education, employment, and leisure opportunities, may lead to occupational deprivation, which refers to the inability to participate in meaningful occupations due to external circumstances (Whiteford, 2003). When multiple constraints to occupational engagement exist for individuals, families, or communities that are rooted in SDOH, health disparities increase. During the COVID-19 pandemic, SDOH have had a considerable, disproportionate impact on health outcomes and hospitalizations for certain populations, including individuals and families experiencing homelessness, poverty-stricken neighborhoods with limited access to healthcare, and Black, Hispanic/Latinx, and Native American communities (Turner-Musa et al., 2020) (Singu et al., 2020). Therefore, it is important to understand how SDOH impact health and wellness outcomes of community-dwelling older adults to inform interventions, community-based programs, and resource allocation to support productive aging (Marfeo & Ward, 2020).

Research Objectives

Few studies have investigated the relationship between overall subjective well-being and multiple health indicators among older adults. In addition, there is limited research examining several social determinants of health, particularly economic, social, and environmental factors, and their unique effects on the relationships between well-being and health measures from an occupational therapy perspective. Therefore, the primary aim of this thesis project is to examine the association between four distinct health indicators and subjective well-being among community-dwelling older adults using data from the NHATS. A secondary aim is to identify other determinants of health, including social, economic, and environmental factors that may

explain the relationship between health status and well-being. These aims will be achieved by completing the following research objectives:

1) To examine the relationship between four distinct types of health measures and subjective well-being in community-dwelling older adults.
2) To examine the mediating effects of SDOH constructs on the relationships between health measures and subjective well-being in community-dwelling older adults.

It is hypothesized that hospitalizations, self-rated health, depressive symptoms, and participation are independently associated with subjective well-being, and those relationships are largely explained (mediated) by social determinants of health. Specifically, increased number of hospitalizations, poor self-rated general health, increased depressive symptoms, and decreased participation in valued activities will be associated with lower subjective well-being.

METHODOLOGY

Data Source

The National Health and Aging Trends Study (NHATS) is a longitudinal survey study of a nationally representative sample of Medicare beneficiaries ages 65 and older in the United States (Kasper & Freedman, 2020). The NHATS gathers information on trends in later life functioning and daily living of older adults in the U.S. The purpose of the NHATS is to provide a resource for research to improve our understanding of the impacts of disability, social, environmental, and economic challenges on late-life functioning, and how to maximize health and quality of life for older adult populations. Begun in 2011, NHATS researchers conduct annual, in person interviews with Medicare beneficiaries to capture snapshots of late-life functioning. More than 95% of older adults in the U.S. are enrolled in Medicare (NHATS, 2021). Content of the NHATS was created by a multidisciplinary team of researchers in various health and related fields. Development of the NHATS content was guided by a conceptual framework for disability adapted from the WHO ICF model and the Institute of Medicine (IOM) Nagi Model of Disablement (Kasper & Freedman, 2020). The NHATS Disability Conceptual Framework represents similar key concept areas of health and functioning, and the dynamic interplay between factors (Kasper & Freedman, 2020) A comparison between the ICF model and the adapted NHATS conceptual framework is provided below.

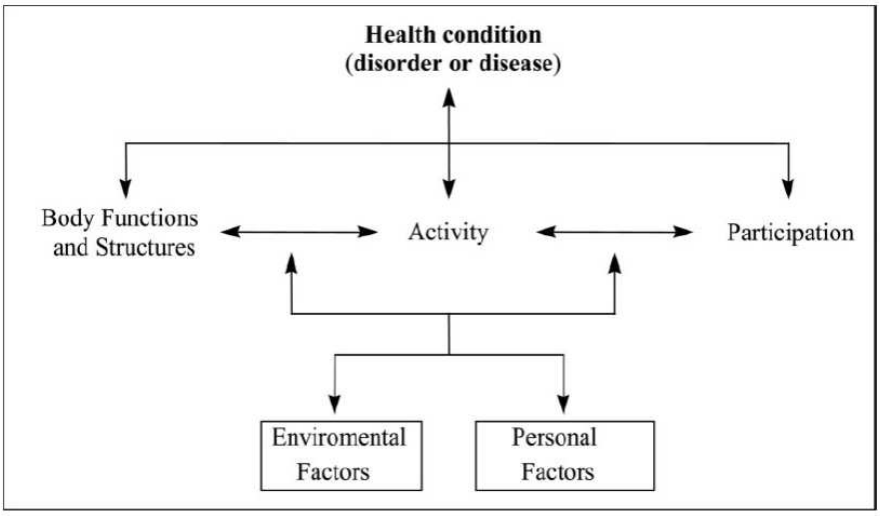

Figure 1: *ICF Conceptual Framework from WHO (Stucki, 2005).*

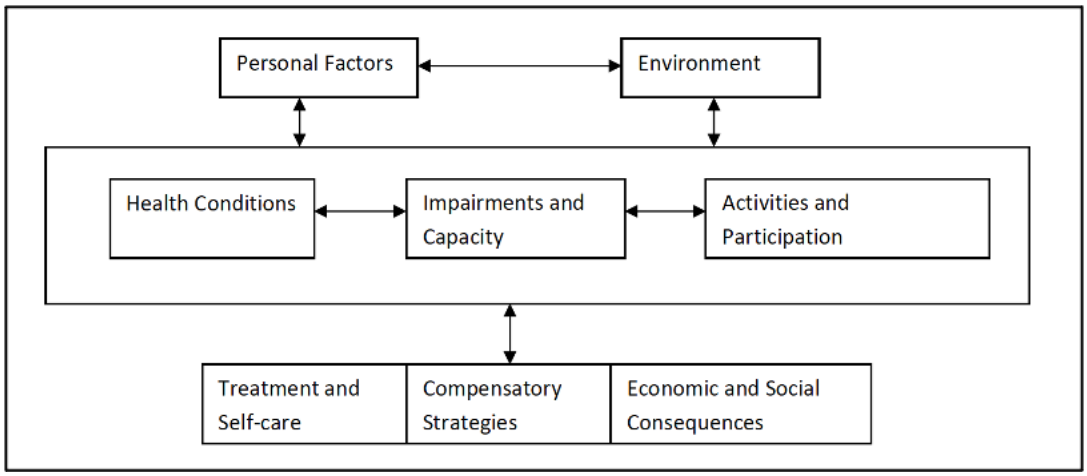

Figure 2: *NHATS Conceptual Framework and Key Concept Areas (Kasper & Freedman, 2020)*

NHATS variables were developed and organized within key concept areas of the disability framework: Health conditions; impairments in body functions/structures; physical and cognitive capacities; accommodations; essential tasks such as self-care, mobility, medical care tasks, and household tasks; participation; and the different physical, social, service, and technological environments. A detailed version of the NHATS Disability Conceptual Framework reflecting these definitions is pictured below.

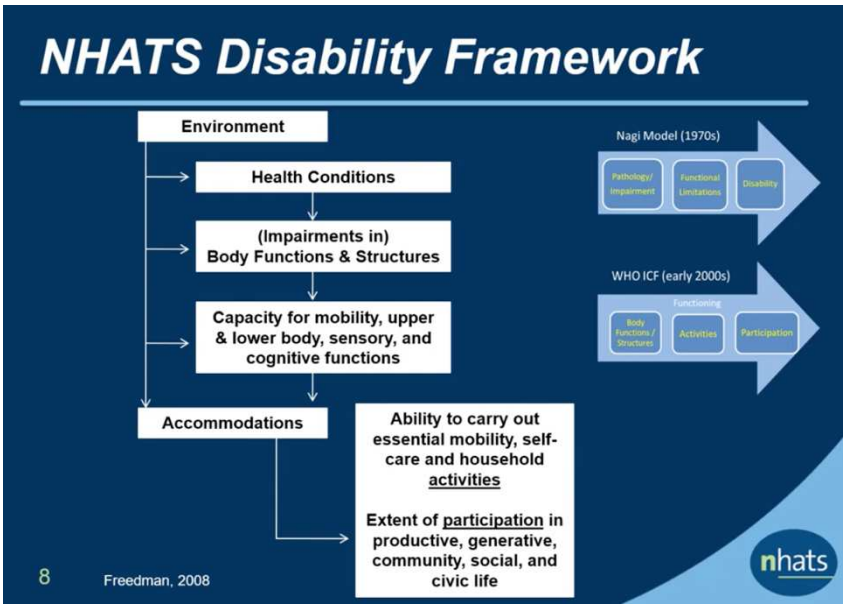

Figure 3: *NHATS Disability Conceptual Framework and comparison to Nagi Model and WHO ICF (Slide from NHATS video tutorial. Retrieved from www. NHATS.org).*

Data for this study were extracted from the public files of the NHATS Round 9 interview data from 2019. The NHATS is funded by the National Institute on Aging and Johns Hopkins University Bloomberg School of Public Health with data collection from Westat (Kasper & Freedman, 2020).

Sample

NHATS participants are sampled using a multi-stage stratified sampling design. Primary sampling units (PSUs) included samples from individual counties, groups of counties, or regions within the 48 contiguous states, which excludes those living in Hawaii, Alaska, and the U.S. territories (NHATS, 2021). From the PSUs, secondary sampling units (SSUs) were created using zip codes or clusters of zip codes. Then, within SSUs, Medicare beneficiaries ages 65 and older were sampled, with oversampling of persons over the age of 90 and of Black, non-Hispanic individuals. The original NHATS sample from Round 1 in 2011 was replenished in 2015 for Round 5. Round 9 includes the original surviving participants from Rounds 1-4 (2011- 2014),

and new participants who were added in Round 5 and evaluated from 2015- 2018. A table representing the NHATS samples per year is shown below.

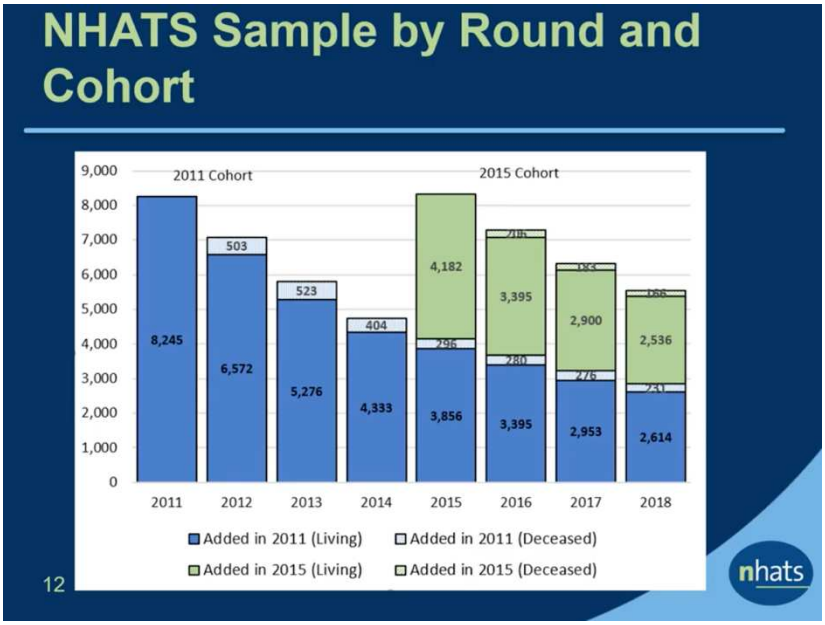

Figure 4. *Representation of NHATS samples by round and corresponding year (Slide from NHATS video tutorial. Retrieved from www. NHATS.org).*

For this study, we excluded individuals who 1) were living in a residential care setting or nursing home, 2) relied on a proxy respondent who could not answer the self-reported well-being questions, or 3) had missing data on the well-being or key health indicator variables. The final sample included 4189 community-dwelling older adults.

Measures and Variables

Independent variables: Hospitalizations, self-rated health, depressive symptoms, and participation

The independent variables included four distinct types of health measures. First, the number of hospitalizations during the prior 12 months served as an objective indicator of health status. The NHATS asks participants whether they have been hospitalized in the last year using dichotomous codes (1 = Yes; 2 = No). In addition, NHATS asks participants to report total number of hospital

stays within the last 12 months. We explored the linear relationship between well-being and number of hospitalizations and created the following categories: 0, 1, >1 hospitalizations. Second, general self-rated health served as a subjective indicator of health status. The self-rated health item in the NHATS asks participants to rate their health on a five-point Likert Scale (1 = Excellent; 2 = Very Good; 3 = Good; 4 = Fair; 5 = Poor). Third, depressive symptoms are measured using the Patient Health Questionnaire (PHQ-2), which is a validated, 2-item questionnaire asking the frequency of feeling down, depressed, or hopeless, and asking the frequency of feeling little interest or pleasure (Kroenke et al., 2003). Both items on the NHATS are answered with 4 codes (1 = Not at all; 2 = Several days; 3 = More than half the days; 4 = Nearly every day). To measure participation, we used the operational definitions for social participation as presented in Sagherian et al. (2021). The NHATS asks four questions, including visiting family or friends, attending religious services, participating in clubs, and going out for enjoyment in the past month (1 = Yes; 2 = No). These activities were recoded (No = 0, Yes = 1) and summed to produce a composite score for social participation. Descriptions of key independent variables are shown in Table 1.

Outcome measure: Subjective well-being

The NHATS includes 12 well-being items, however, 11 were used in the current analysis to create a validated, single-factor measure for overall subjective well-being. The item that was not included asks participants about the subjective age they feel most of the time. This item was not included in a prior factor analysis examining the factor structure of well-being (Kim et al., 2015). Additionally, the 11 items used represent both eudaimonic and hedonic constructs, and include questions regarding life satisfaction, self-realization, self-determination, and positive/negative affect. Subjective age has not been used to reflect eudaimonic or hedonic constructs of well-

being, therefore, it was left out of the final well-being measure. Four scales of well-being measure the frequency of positive and negative emotions throughout daily life using a five-point scale (1 = Every day; 2 = Most days; 3 = Some days; 4 = Rarely; 5 = Never). These four items ask how often the person feels cheerful, bored, full of life, and upset. These items were re-coded into a 3-point scale to include the following response groups: Every day, Most days, and Some days-Never. The additional seven scales of well-being measure the sample person's evaluation of their lives on a three-point Likert scale (1 = Agree a lot; 2 = Agree a little; 3 = Agree not at all). These seven items ask the degree to which the sample person agrees with the following statements, 'My life has meaning and purpose,' 'I feel confident and good about myself,' 'I gave up trying to improve my life a long time ago,' 'I like my living situation very much,' 'Other people determine most of what I can and can't do,' 'When I usually want to do something, I find a way to do it,' and 'I have an easy time adjusting to change.' Certain variables of well-being were reverse coded so that a higher score reflects a higher level of subjective well-being. This included two positive affect variables: WB1 (cheerful) and WB3 (full of life), and five self-realization variables: WB5 (life has meaning/purpose), WB6 (confidence), WB8 (likes living situation), WB10 (find ways to do things), and WB11 (adjusts to change) (Kim et al., 2016). Table 2 demonstrates the categorization of well-being items.

Table 1. *Definitions of key measures*.

Variables	Description	Scale Items	Indication
Well-being, primary outcome measure	Hedonic and eudaimonic constructs of well-being, summed to yield a validated, single-factor measure	Positive/Negative affect Self-realization Self-determination	Higher score indicates a higher subjective well-being
Hospitalizations, independent variable	Number of overnight hospital stays in the last 12 months	Frequency of hospital stays (0, 1, >1)	Higher score indicates a higher number of hospital stays
General self-rated health, independent variable	Self-reported general health status	Excellent, Very good, Good, Fair, Poor	Higher score indicates better self-rated health (reverse coded)
Depressive symptoms, independent variable	Sum of frequencies at which participants reported depressive symptoms	Feeling down, depressed, or hopeless; had little interest or pleasure in doing things (range: 0-2)	Higher score indicates more depressive symptoms
Participation, independent variable	Sum of engagement in social participation	Visiting friends/family, attending religious services, participating in clubs, going out for enjoyment (range: 0-4)	Higher score indicates higher participation (reverse coded)

Table 2. *Well-being items from the NHATS categorized into hedonic and eudaimonic constructs (Kasper & Freedman, 2020).*

Hedonic Constructs "During the last month, how often did you feel…"	5 Point Scale Measurement
WB1. Cheerful? **	1 = Every day 2 = Most days 3 = Some days 4 = Rarely 5 = Never
WB2. Full of life? **	
WB3. Upset?	
WB4. Bored?	

Eudaimonic Constructs (Self-Realization and Self-Determination)	3 Point Likert Scale Measurement
WB5. My life has meaning and purpose. **	1 = Agree a lot 2 = Agree a little 3 = Agree not at all
WB6. I feel confident and good about myself. **	
WB7. I gave up trying to improve my life a long time ago.	
WB8. I like my living situation very much. **	
WB9. Other people determine most of what I can/can't do.	
WB10. When I want to do something, I find a way. **	
WB11. I have an easy time adjusting to change. **	

***Indicates items reverse coded to reflect a higher score.*

Social determinants of health

The NHATS does not label definitive SDOH variables, however, it contains questions about participants' daily activities that may serve as delegates for SDOH domains as defined by the CDC (CDC, 2021). We adapted the methodology from Anderson et al. (2019), who utilized NHATS variables as proxies to examine potential health-related social needs among a sample of older adults.

The following categories from NHATS were chosen to represent SDOH domains: economic well-being, home ownership, early life, medical care activities, community, and

environmental checklist. Variables were chosen from each category to best represent the linked SDOH domain and key issues. The selected NHATS variables reflect personal, environmental, and social factors that may impact older adults' participation in activities of daily life, and best reflect SDOH domains. Utilizing these methods to measure SDOH reflect concepts of the ICF model, including participation, environmental factors, and personal factors, and their potential influence on health conditions and disease (Stucki, 2005).

To represent the SDOH domain of economic stability, we used the following variables from the NHATS' economic well-being and home ownership categories: participation in food stamps in the last year; receiving other food assistance in the last year; or receiving assistance for gas, electricity, or other utilities in the last year; and living in section 8 or public housing. All four questions entail a dichotomous (yes/no) response. For the current study, a 'yes' response to any of the above questions was considered an indicator of low economic stability.

To address the SDOH domain of education access and quality, we used a variable from the early life category of the NHATS which asks participants about their level of education. We followed the methodology from Lin & Wu (2014) for re-coding this variable into four groups: 1 = less than high school education; 2 = high school degree or equivalent; 3 = trade school, associate's degree, or some college; 4 = bachelor's degree or an advanced degree.

To represent the SDOH domain of healthcare access and quality, we used variables from the medical care activities category from the NHATS. We assessed participants' access to a regular doctor and health literacy by using two variables. The variables ask participants whether they have access to a regular doctor, and whether they need help understanding the doctor. Both variables are coded dichotomously (yes/no). These variables were examined separately in the healthcare access and quality domain.

For the SDOH domain of social and community context, we used 3 items from the community category of the NHATS. These 3 items ask participants the degree to which they agree with the following statements about their community: people know each other well, people are willing to help one another, and people can be trusted. These items are coded using a three-point Likert scale and were summed to yield a total score, with higher scores indicating a more positive perception of one's social and community context. The summed scores were re-coded into a three-level ordinal variable: 1 = 3; 2 = 4-6; and 3 = 7-9. The methodology for using and summing these variables from the NHATS follows Qin et al. (2021).

For the last SDOH domain of neighborhood and built environment, we used 3 items from the environmental checklist category of the NHATS. Unlike the other categories, the environmental checklist is completed by the interviewer, who observes and documents the surrounding conditions of the respondent's home (Kasper & Freedman, 2020). Qin et al. (2021) used 3 dichotomous (yes/no) items from the NHATS to measure neighborhood physical disorder, including the presence of litter/glass on the ground, graffiti on surrounding building walls, and the presence of vacant homes or stores surrounding the respondents' residences. Following the methodology from Qin et al. (2021), these items were summed to yield a score for neighborhood and built environment quality. See Table 3 for a summary of linking NHATS categories and variables to specific SDOH domains.

Table 3. *List of NHATS variables to be included and their compatible SDOH. SDOH Domains (CDC, 2021); NHATS Variables (Kasper & Freedman, 2020).*

SDOH Domains	NHATS Equivalent Sections and Variables
Economic Stability Includes topics such as poverty, employment, food security, and housing stability	**Economic Well-Being** • Participation in the last year in food stamps (ew9progneed1) • Participant received other food assistance in last year (ew9progneed2) • Participant received gas, electricity, or other utility assistance in last year (ew9progneed3) **Home Ownership** • Section 8/public housing or low-income housing (hp9sec8pubsn)
Education Access and Quality Includes topics such as graduating from high school, higher education, general education attainment, language and literacy, and early childhood education and development	**Early Life** • Level of education
Healthcare Access and Quality Includes topics such as access to healthcare, access to primary care, health insurance coverage, and health literacy	**Medical Care Activities** • Participant has a regular doctor (mc9havregdoc) • Participant needs help understanding the doctor (mc9tpersevr4)
Social and Community Context Includes topics such as cohesion within a community, civic participation, discrimination, conditions in the workplace, and incarceration	**Community** • People know each other well (cm9knowwell) • People are willing to help one another (cm9willnghlp) • People can be trusted (cm9peoptrstd)
Neighborhood and Built Environment Includes topics such as quality of housing, access to transportation, availability of health foods, air and water quality, and neighborhood crime and violence	**Environmental Checklist** • Litter/glass on sidewalk or street (ir9areacond1) • Graffiti on surrounding building walls (ir9areacond2) • Vacant houses or stores surrounding the respondent's residence (ir9areacond3)

Covariates

We controlled for age, gender, race/ethnicity, and marital status. Age in years was included as a continuous variable. Gender is measured dichotomously (male; female). Race and ethnicity is a categorical variable measured using the following codes: White, non-Hispanic; Black, non-Hispanic; Other (Am Indian/Asian/Native Hawaiian/Pacific Islander/other specify), non-Hispanic; Hispanic; More than one DKRF primary; DKRF (Don't know/Refusal). We excluded participants with the two don't know or refused (DKRF) responses. Marital status is also a categorical variable measured using the follow descriptors: 1 = Married; 2 = Living with a partner; 3 = Separated; 4 = Divorced; 5 = Widowed; 6 = Never married. We collapsed the variable into a two-category variable (married or living with a partner; no partner).

Data Analysis Approach

Descriptive summaries of all variables (means and standard deviations of continuous variables; frequencies and percentages of categorical variables) were tabulated to describe the sample characteristics. Next, we performed bivariate analyses to examine the unadjusted association between well-being scores and all covariates, independent variables, and potential mediating variables. We used Pearson correlation for continuous variables, ANOVA for categorical variables with three or more categories, and independent t-tests for dichotomous variables.

Lastly, we performed stepwise multiple regression following the approach described by Zahuranec et al. (2017). With well-being as the dependent variable, model 1 included demographic covariates and the four health and participation variables: number of hospitalizations, self-reported health, depression symptoms, and participation. Models 2-6 added one SDOH domain at a time so the mediating effects of all five domains could be examined

individually. The final model included all variables from model 1 along with any of the SDOH variables that were significantly associated with well-being in models 2-6.

RESULTS

Sample Characteristics

Sociodemographic variables

Tables 4 and 5 provide descriptive summaries of the sample. The mean age of participants at the time of interviews was 80.4 years (SD 6.9), and age was significantly correlated with subjective well-being ($r = -0.182$; $p < 0.001$). There were more female than male participants: 58% vs. 42%. Males reported slightly higher mean well-being scores than females, 28.7 (3.1) and 28.2 (3.3), respectively. A majority of the participants were White, non-Hispanic (72%). On average, White, non-Hispanic individuals had a well-being score of 28.5 (3.2). Approximately 20% of the participants were Black, non-Hispanic, and 5% of participants were Hispanic. On average, Black, non-Hispanic individuals had a well-being score of 28.4 (3.1), which is almost identical to White, non-Hispanic individuals. Hispanic individuals had an average well-being score of 27.5 (3.9). There is a small percentage of participants (< 3%) who identified as other, non-Hispanic ethnicities, including American Indian, Asian, Native Hawaiian, Pacific Islander or other, and their average well-being score was 28.1 (3.0). Marital status was fairly split between the sample: 46% were married or living with a partner and 46% were not. Participants who were married or living with a partner had an average well-being score of 28.9 (3.0), and participants who did not have a partner had an average well-being score of 28.0 (3.3). Group differences in mean well-being scores were significantly different within all three categorical sociodemographic variables ($p < 0.001$).

Subjective well-being

Scores from the 11 subjective well-being items were summed, which yielded a range of scores from 13-33, with higher scores indicating greater sense of well-being. The mean (SD) well-being score was 28.4 (3.2). This indicates that participants, on average, were experiencing moderate to high levels of subjective well-being at the time of the interview. See Appendix A for detailed descriptions and frequencies of each well-being item, including emotional affect, life satisfaction, and self-determination.

Health-related variables

A majority of older adults in the sample experienced zero hospitalizations in the last 12 months (78%). However, approximately 14% of older adults experienced 1 hospitalization, and approximately 8% of older adults experienced greater than 1 hospitalization in the prior year. Mean (SD) well-being scores were 28.7 (3.1) for the no hospitalizations group, 27.9 (3.4) for the 1 hospitalizations group, and 26.9 (3.4) for the greater than 1 hospitalizations group. Self-rated general health responses were fairly well distributed across the three categories: 'Very Good' to 'Excellent' (38%), 'Good' (37%), and 'Fair' to 'Poor' (24%). Well-being scores ranged from 29.8 (2.4) for the 'Very good' to 'Excellent' group to 26.5 (3.5) for the 'Fair' to 'Poor' group. The items from the PHQ-2 indicating depressive symptoms were summed to yield a total score. Those symptoms included feeling down, depressed, hopeless; and having little interest or pleasure in doing things. Approximately 30% of the sample reported a score of 0, indicating no depressive symptoms from the PHQ-2, 28% reported 1 symptom, and 26% reported 2 symptoms, which indicates experiencing both depressive symptoms at least several days of the week or more. Well-being scores ranged from 29.7 (2.5) for the no symptoms group to 25.8 (3.4) for the

both symptoms group. Unadjusted group differences in mean well-being scores were significantly different within all four categorical health-related variables ($p < 0.001$).

Participation in social activities

Social activity variables from the NHATS were summed to yield a total score (range 0-4). The mean score for participation in social activities among the sample of community-dwelling older adults was 2.6 (1.1). This indicates that on average, Medicare beneficiaries participate regularly in at least two of the four social activities, including going out for enjoyment, visiting friends or family, attending religious services, and attending clubs or group activities. In particular, a majority of older adults from the sample participated in visiting friends or family and going out for enjoyment. See Appendix B for frequencies of specific social activities among the sample of Medicare beneficiaries. The composite social participation score was significantly correlated with well-being ($r = 0.321$; $p < 0.001$).

Social determinants of health variables

Four variables from the NHATS were used as proxy indicators for economic stability. Approximately 85% of older adults did not report receiving federal assistance for food, utilities, or housing, and had a mean well-being score of 28.6 (3.1) The remaining 15% who responded 'yes' to 1 or more low economic stability indicators had a mean well-being score of 27.2 (3.5). This difference was statistically significant ($p < 0.001$).

Social and community context items were summed to yield a total score (range 3-9). Two-thirds of the sample achieved scores of 7-9, which indicates a more positive perception of the social cohesion of their community. They had a mean well-being score of 28.9 (3.0). Approximately 28% of the sample responded with scores of 4-6, and had an average well-being score of 27.8 (3.4). Less than 5% of the sample responded with a score of 3, which indicates a

negative perception of the social cohesion within their neighborhood and community contexts. They had the lowest mean well-being score of 26.6 (3.7). See Appendix C for detailed information about the frequencies and responses to each of the community context variables from the NHATS.

Education levels were grouped into 4 categories. Approximately 29% received a Bachelor's degree or an advanced degree, 28% obtained a 2-year degree or attended some college, 25% completed high school or obtained an equivalent degree, and 18% did not complete high school. Mean well-being scores ranged from 29.3 (2.8) for the bachelor's or advanced degree group to 27.3 (3.5) for the less than high school group. Overall, mean well-being scores differed significantly across education levels ($p < 0.001$).

The healthcare access and quality domain was assessed using two separate variables from the NHATS: needing help understanding a doctor and access to a regular doctor. Approximately 57% of respondents did not need help understanding a doctor, whereas 43% reported they do need help. Mean well-being scores were significantly ($p < 0.001$) lower for those needing help compared to those who did not: 27.1 (3.4) and 28.6 (3.0), respectively. More than 95% of Medicare beneficiaries reported having access to a regular doctor, with a mean well-being score of 28.5 (3.2). The 4% who did not report having access to a regular doctor had a mean well-being score of 27.9 (3.8). This difference was not statistically significant ($p = 0.023$).

We used three variables to indicate a poor neighborhood and built environment: presence of litter, graffiti, or vacant houses and stores surrounding the respondents' homes. A response of 'yes' to at least one or more of those variables was an indicator for a poor built environment. Approximately 8% of interviewers observed at least one indicator for a poor neighborhood or built environment, and respondents had an average well-being score of 27.7 (3.4). 92% of

interviewers did not observe the presence of litter, graffiti, or vacant homes/stores surrounding participants' homes, and respondents in those neighborhoods had an average well-being score of 28.5 (3.2). This difference was statistically significant ($p < 0.001$).

***Table 4**. Descriptive summaries of continuous variables and bivariate correlations with well-being.*

	N	Mean	SD	Pearson's r*	p-value
Age	4189	80.4	6.9	-.182	< .001
Participation	4187	2.6	1.1	.321	< .001
Well-being	4165	28.4	3.2	--	--

**Correlation with well-being score*

***Table 5**. Count and frequency distributions of categorical variables and unadjusted differences in well-being scores.*

			Well-being score		
	N	(%)	Mean*	SD	p-value
Sex					< .001
Female	2422	(58.2%)	28.2	3.3	
Male	1743	(41.8%)	28.7	3.1	
Race/ethnicity					< .001
White, non-Hispanic	2968	(72.2%)	28.5	3.2	
Black, non-Hispanic	833	(20.3%)	28.4	3.1	
Other, non-Hispanic	103	(2.5%)	28.1	3.0	
Hispanic	207	(5.0%)	27.5	3.9	
Current partner status					< .001
Married or live w/ partner	1921	(46.1%)	28.9	3.0	
No partner	2244	(53.9%)	28.0	3.3	
Self-rated general health					< .001
Very Good to Excellent	1620	(38.9%)	29.8	2.4	
Good	1545	(37.1%)	28.3	3.0	
Fair to Poor	997	(24.0%)	26.5	3.5	
Number of hospitalizations prior year					< .001
No Hospitalizations	3249	(78.3%)	28.7	3.1	
1 Hospitalization	589	(14.2%)	27.8	3.4	
> 1 Hospitalization	312	(7.5%)	26.9	3.4	
Depressive symptoms					< .001
No symptoms	2407	(57.8%)	29.7	2.5	
One symptom	983	(23.6%)	27.5	3.0	
Both symptoms	773	(18.6%)	25.8	3.4	
Economic stability indicator					< .001
No assistance	3553	(85.3%)	28.6	3.1	
Some assistance	610	(14.7%)	27.2	3.5	

Social & community context sum					< .001
3	183	(4.5%)	26.6	3.7	
4-6	1154	(28.3%)	27.8	3.4	
7-9	2737	(67.2%)	28.9	3.0	
Education level					< .001
Bachelors or Advanced Degree	1181	(28.7%)	29.3	2.8	
2-yr Degree or Some college	1142	(27.8%)	28.7	3.0	
High School or Equivalent	1044	(25.4%)	28.0	3.3	
< High School	748	(18.2%)	27.3	3.5	
Need help understanding doctor					< .001
Yes	943	(56.8%)	27.1	3.4	
No	716	(43.2%)	28.6	3.0	
Access to a regular doctor					.023
Yes	3983	(95.7%)	28.5	3.2	
No	181	(4.3%)	27.9	3.8	
Poor neighborhood / environment indicator					< .001
Yes	328	(8.0%)	27.7	3.4	
No	3758	(92.0%)	28.5	3.2	

**Mean differences were tested via ANOVA or independent t-tests.*

Relationships Between Well-Being and Independent Variables

Table 6 presents the regression coefficients and 95% confidence intervals from the stepwise multivariable regression analysis exploring the relationships between sociodemographic covariates, health-related variables, participation, SDOH measures, and subjective well-being among the sample of Medicare beneficiaries.

Number of hospitalizations and well-being

In the base model, with no hospitalizations as the reference group, the >1 hospitalizations group demonstrated a significant effect on well-being scores (B = -0.40; 95% CI -0.71, -0.09). This finding supports our hypothesis that a higher number of hospitalizations would be significantly associated with subjective well-being of older adults. Interestingly, there was no significant difference in subjective well-being scores between the reference group and participants who reported experiencing 1 hospitalization in the last year (B = -0.09; 95% CI -0.33, 0.14).

General self-rated health and well-being

General self-rated health demonstrated a significant stepwise relationship with well-being scores across the three categories. With 'Very good' to 'Excellent' as the reference category, we observed the following parameter estimates (95% CIs): 'Good' = -0.91 (-1.10; -0.72) and 'Fair' to 'Poor' = -1.75 (-1.98, -1.51). These findings are consistent with our hypothesis.

Depressive symptoms and well-being

Depressive symptoms also demonstrated a significant (negative) stepwise relationship with well-being scores, which supported our hypothesis. Using no symptoms as the reference group, parameter estimates for the 1- and 2-symptom groups were -1.47 (-1.67, -1.27) and -2.95 (-3.18, -2.72), respectively.

Social participation and well-being

We included the summed social participation score as a continuous variable, because it demonstrated a linear relationship with well-being. The regression suggests that for each one-point increase in social participation, well-being scores increased by half a point (B = 0.53 [0.45, 0.61]). These findings confirm our hypothesis that increased participation in meaningful and social activities would be positively associated with subjective well-being scores.

Independent Effects of SDOH on Well-Being

The dichotomous economic stability measure showed that Medicare beneficiaries who answered 'Yes' to requiring federal, financial assistance for food, utility payments, and/or housing experienced a significant decrease in subjective well-being scores compared to those who answered 'No' to all three items (B = -0.38 [-0.62, -0.14]).

The education variable demonstrated a stepwise relationship with well-being scores. With bachelor's or advanced degree as the reference group, the parameter estimates were -0.10 (-0.31,

0.12), -0.45 (-0.68, -0.23), and -0.57 (-0.84, -0.30) for the 2-year degree or some college, high school or equivalent, and less than high school groups, respectively.

We used two separate dichotomous variables for healthcare access and quality. Participants who answered 'Yes' to requiring help understanding the doctor experienced a significant decrease in subjective well-being scores compared to participants who answered 'No,' (B = -0.66 [-0.92, -0.40]). There was no significant difference between participants who reported having access to a regular doctor compared to those who do not (B = 0.39 [-0.01, 0.79]).

The social and community context variable summed respondents' agreement (3-point scales) with three different questions related to the people and relationships within their communities. Using disagreements to all questions (score = 3) as the reference, only those who tended to agree a lot (score = 7-9) differed significantly (B = 1.08 [0.68, [1.47]). The middle group who tended to agree a little (score = 4-6) did yield slightly higher estimated well-being scores, but it did not reach statistical significance (B = 0.40 [.00, 0.81]).

The neighborhood and built environment domain was documented by the interviewers regarding their observations of litter or glass on the ground, graffiti on surrounding buildings, and the presence of vacant homes or stores in the neighborhood. This variable was not significantly related to respondent's self-reported well-being scores after adjusting for other variables (B = 0.03 [-0.28, 0.34]).

Mediating Effects of SDOH on Well-being Relationships

There was only one mediating effect observed in the final regression analysis. The relationship between hospitalization and well-being was mediated by the variables utilized to represent the SDOH domain of 'healthcare access and quality.' Together, the variables used for health literacy and primary care access eliminated the significant relationship between hospitalization and well-

being when added to the base model (B = -0.29 [-0.60, 0.03]), and when included in the final model with other significant SDOH variables. The relationship between the other independent variables and well-being were essentially unaffected by the individual SDOH domains, and when combined in the fully adjusted model (see Models 2-7 in Table 6). These mixed results partially support our hypothesis that SDOH variables would largely explain the effects of health and participation on subjective well-being scores.

***Table 6**. Results of stepwise multivariable regression.*

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
	B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)	B (95% CI)
Intercept	**32.56** (31.54,33.57)	**32.65** (31.63,33.67)	**31.99** (30.91,33.08)	**32.64** (31.61,33.67)	**31.69** (30.56,32.83)	**32.37** (31.32,33.43)	**31.68** (30.53,32.83)
Age	**-0.05** (-0.06, -0.04)	**-0.05** (-0.06, -0.04)	**-0.05** (-0.06, -0.04)	**-0.05** (-0.06, -0.03)	**-0.04** (-0.05, -0.03)	**-0.05** (-0.06, -0.03)	**-0.04** (-0.05, -0.03)
Sex [Female]							
Male	0.11 (-0.06,0.29)	0.11 (-0.07,0.28)	0.10 (-0.07,0.27)	0.08 (-0.09,0.26)	0.13 (-0.04,0.31)	0.13 (-0.04,0.31)	0.08 (-0.09,0.26)
Race/ethnicity [White, non-Hispanic]							
Black, non-Hispanic	**0.59** (0.39,0.80)	**0.66** (0.44,0.87)	**0.61** (0.40,0.82)	**0.68** (0.47,0.90)	**0.61** (0.40,0.82)	**0.62** (0.41,0.83)	**0.74** (0.52,0.96)
Other, non-Hispanic	-0.13 (-0.64,0.38)	-0.07 (-0.59,0.44)	-0.14 (-0.65,0.37)	-0.10 (-0.61,0.41)	-0.09 (-0.60,0.42)	-0.06 (-0.58,0.46)	-0.01 (-0.52,0.50)
Hispanic	0.21 (-0.16,0.59)	0.27 (-0.10,0.65)	0.27 (-0.10,0.65)	0.38 (-0.01,0.77)	0.26 (-0.11,0.64)	0.24 (-0.14,0.62)	**0.50** (0.12,0.88)
Partner status [Married or living with]							
No partner	-0.17 (-0.35,0.01)	-0.13 (-0.31,0.05)	-0.11 (-0.29,0.07)	-0.14 (-0.32,0.04)	-0.18 (-0.36,0.00)	-0.18 (-0.37,0.00)	-0.07 (-0.25,0.11)
Self-rated health [Very good to excellent]							
Good	**-0.91** (-1.10, -0.72)	**-0.90** (-1.08, -0.71)	**-0.89** (-1.08, -0.71)	**-0.86** (-1.05, -0.67)	**-0.87** (-1.06, -0.68)	**-0.91** (-1.10, -0.72)	**-0.81** (-1.00, -0.62)
Fair to Poor	**-1.75** (-1.98, -1.51)	**-1.72** (-1.96, -1.49)	**-1.67** (-1.90, -1.43)	**-1.68** (-1.92, -1.44)	**-1.66** (-1.90, -1.43)	**-1.76** (-2.00, -1.52)	**-1.51** (-1.75, -1.27)
Number of hospitalizations [None]							
1 Hospitalization	-0.09 (-0.33,0.14)	-0.08 (-0.31,0.16)	-0.04 (-0.27,0.19)	-0.08 (-0.32,0.15)	-0.04 (-0.27,0.20)	-0.10 (-0.34,0.14)	0.04 (-0.19,0.28)
>1 Hospitalization	**-0.40** (-0.71, -0.09)	**-0.39** (-0.70, -0.08)	**-0.41** (-0.72, -0.10)	**-0.39** (-0.70, -0.08)	-0.29 (-0.60,0.03)	**-0.42** (-0.74, -0.11)	-0.28 (-0.60,0.03)

Depressive symptoms [None]							
1 symptom	**-1.47**	**-1.46**	**-1.45**	**-1.43**	**-1.44**	**-1.45**	**-1.39**
	(-1.67, -1.26)	(-1.66, -1.26)	(-1.65, -1.24)	(-1.64, -1.23)	(-1.65, -1.24)	(-1.66, -1.25)	(-1.59, -1.19)
2 symptoms	**-2.95**	**-2.93**	**-2.92**	**-2.94**	**-2.91**	**-2.96**	**-2.86**
	(-3.18, -2.72)	(-3.16, -2.70)	(-3.15, -2.69)	(-3.17, -2.71)	(-3.14, -2.69)	(-3.19, -2.73)	(-3.08, -2.63)
Social participation	**0.53**	**0.51**	**0.46**	**0.49**	**0.51**	**0.53**	**0.41**
	(0.45,0.61)	(0.44,0.59)	(0.38,0.54)	(0.41,0.57)	(0.43,0.59)	(0.45,0.61)	(0.33,0.49)
Economic stability [No assistance]							
Some assistance		**-0.38**					**-0.30**
		(-0.62, -0.14)					(-0.54, -0.05)
Social & community sum [< 4]							
4-6			0.40				**0.35**
			(-0.01,0.81)				(-0.06,0.75)
7-9			**1.07**				**1.04**
			(0.68,1.47)				(0.65,1.44)
Education [Bachelors +]							
Trade / Associates Degree or Some college				-0.09			-0.02
				(-0.31,0.12)			(-0.24,0.19)
High School or Equivalent				**-0.45**			**-0.38**
				(-0.67, -0.23)			(-0.61, -0.16)
< High School				**-0.57**			**-0.44**
				(-0.84, -0.30)			(-0.72, -0.17)
Need help understanding doctor [No]							
Yes					**-0.66**		**-0.60**
					(-0.91, -0.40)		(-0.86, -0.34)
Have regular doctor [No]							
Yes					0.38		
					(-0.02,0.78)		
Built environment indicator [Yes]							
No						0.03	
						(-0.28,0.34)	

**Categories in [brackets] are reference categories. Bolded regression coefficients (B) indicate statistical significance.*

DISCUSSION

The current study sought to answer two research aims. The first aim of this project was to explore the relationships between subjective well-being, several different health indicators (hospitalizations, self-rated general health, and depressive symptoms), and participation among a sample of community-dwelling older adults. The second aim of this project was to identify and examine whether measures for SDOH mediate or partially explain the relationships between well-being, health indicators, and participation among the sample of community-dwelling older adults. Our hypothesis was that hospitalizations, self-rated general health, depressive symptoms, and participation would each be independently, significantly associated with subjective well-being of older adults. In addition, we hypothesized that each of the SDOH measures would independently mediate or partially explain those relationships.

Relationships Between Well-Being and Independent Variables

Number of hospitalizations and well-being

We first examined the relationship between the number of hospital stays and subjective well-being scores among the sample of community-dwelling older adults. The data suggest that older adults who experienced greater than 1 hospitalization in the last 12 months experienced significantly lower well-being compared to older adults who experienced 0 hospitalizations in the last 12 months. This finding aligns with the results from a systematic review, which reported that hospitalizations and repeated readmissions have a tendency to negatively impact adult patients (Alzahrani, 2021). Additionally, this finding supports the results from Whitehall et al. (2019), who found that older adults receiving care in an inpatient acute setting were at greater risk of experiencing lower levels of self-efficacy. Zisberg et al. (2015) found hospital stays were

directly related to post-discharge functional decline among a sample of older adults. Findings from the current study support the results from Zisberg et al. (2015) by further exploring how an increased number of hospitalizations may impact the subjective well-being and self-determination of older adults. Patients experiencing post-discharge functional decline may experience a disruption in their daily routines as a result, which can impact their overall feelings of well-being, satisfaction, and pleasure.

An interesting finding from the data analysis suggests that older adults who experienced 1 hospital stay did not experience significant differences in well-being compared to those who experienced 0 hospitalizations. These findings were not robust enough to support previous findings from the literature, due to a wide confidence interval in the data (-0.33, 0.14). Additionally, Alzahrani (2021) offered different factors from the literature that may influence the hospitalization experience, including physical environmental factors, social-related factors, and health-related factors. NHATS interviewers did not follow up to ask about each participant's hospitalization experience, which may influence a patient's subjective well-being during and after a hospital stay. In addition, the time between the hospital stay and the NHATS interview was not discussed. Time may play a significant role in how well-being is influenced by hospital stays, for example, a patient who was discharged six months ago may have a different emotional response or subjective well-being levels than a patient who was discharged one month ago.

General self-rated health and well-being

The results from the current study indicated that self-rated general health is positively and significantly associated with subjective well-being among the sample of community-dwelling older adults. Older adults who self-rated their general health as 'Fair to Poor' experienced significantly decreased subjective well-being scores compared to older adults who self-rated

their general health as 'Very Good to Excellent.' These findings support the original hypothesis that predicted self-rated health would be strongly associated with subjective well-being among older adults. The results from the current study support findings from the literature exploring the relationships between self-rated health and general well-being outcomes. Lee et al. (2020) reported self-rated health was significantly associated with life satisfaction and quality of life among older adults with Parkinson's Disease. Life satisfaction and quality of life are generally addressed by both hedonic and eudaimonic constructs of well-being assessed within the 11-scale measurement of subjective well-being in the NHATS (Kim, Lehning, & Sacco, 2015). The current findings align with additional studies that found strong associations between poor self-rated health, lower health-related quality of life and higher stress levels (Santos de Oliveira et al., 2020; Whitehead & Blaxton, 2020).

The findings from the current study, along with the cumulative findings from literature, suggest that individuals may perceive their own, general health based on their subjective well-being and the constructs that make up well-being, as opposed to strictly basing their perceived health on other medical, health-related factors. Although the current study did not account for chronic medical conditions or physical limitations of respondents, we can infer that self-rated general health may be influenced by more than just medical factors and physical health, and that it is strongly associated with subjective well-being among older adults. The current findings also support Jeste et al. (2013) who reported resilience and depressive symptoms were strongly associated with self-perceived successful aging, with an effect size comparable to general physical health and its relationship with self-rated aging. The WHO defines health as, "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity," (WHO, n.d.[b]). To further explore the relationship between self-rated general health

and well-being, future research can compare how individuals with and without chronic diseases rate their general health and subjective well-being, and how those relationships change over time.

Depressive symptoms and well-being

The results from the data analysis indicate that older adults who reported one depressive symptom experience a significant decrease in well-being compared to those who reported no depressive symptoms. Additionally, the data show that older adults who reported two depressive symptoms experienced a significant decline in well-being compared to those who reported no symptoms, and compared to those who reported only one symptom of depression. These findings indicate that depressive symptoms are strongly associated with subjective well-being among the sample of community-dwelling older adults. The results from the current study support previous literature exploring the relationships between depressive symptoms and psychological well-being (Rao et al., 2016). The stepwise relationship between depressive symptoms and subjective well-being aligns with findings from Cramm et al. (2012), whose findings suggest that emotional affect is strongly associated with experiencing depressive symptoms. The measures used for well-being include hedonic constructs, which emphasize emotional responses, such as feeling joy, cheerful, upset, or bored, which are similar to the items asked on the PHQ-2 (Kasper & Freedman, 2020). The findings from Cramm et al. (2012) and from the current study may pose a question for future research further exploring the longitudinal relationships between depressive symptoms and psychological well-being in community-dwelling Medicare beneficiaries using NHATS data.

Findings from previous literature suggest that depressive symptoms may be comparable to physical health symptoms and their impacts on well-being. For instance, Zahuranec et al.

(2017) found that activity limitations were not significantly associated with well-being for older adults after stroke after accounting for other factors, including depressive symptoms. Additionally, Jeste et al. (2013) reported resilience and depressive symptoms were strongly associated with self-perceived successful aging, with an effect size comparable to physical health. Findings from Zahuranec et al. (2017) and Jeste et al. (2013) support the findings from the current study suggesting that depressive symptoms have a robust impact on the psychological well-being of community-dwelling older adults, potentially just as strong as physical health or physical symptoms.

Social participation and well-being

The results from the current study suggest that increased social participation is strongly associated with increased subjective well-being among the sample of community-dwelling older adults. Compared to respondents who reported regularly participating in all four social activities, older adults who did not participate in social activities experienced a mean difference in subjective well-being score of approximately 2.5 points. The results from the current study are consistent with findings from Stav et al. (2012), who reported common social activities among older adults included attendance in groups outside the home, presence of a spouse, regular contact with a friend, and participation in social networks. The findings also align with current profound evidence linking participation in social activities to improved health outcomes, quality of life, and decrease in the decline of cognitive and physical health among community-dwelling older adults (Stav et al., 2012). Additional studies reported findings that support strong, positive relationships between productive activities with social aspects, such as volunteering, and psychological well-being among older adults (Sagherian et al., 2021; Fekete et al., 2020). The findings support results from Chi et al. (2021) who reported older adults who engaged in

volunteer activities and provided emotional support experienced less negative affect and experienced an increased number of positive events daily. Although the current study did not analyze participation in volunteer work due to emphasis on social activities, future research can be conducted to explore the longitudinal relationships between participation in social and productive activities and subjective well-being among older adults using NHATs data.

The findings from the current study also align with theories from occupational science that underly occupational therapy foundations and contemporary practice. Matuska & Christiansen (2008) propose a model of lifestyle balance consisting of ideal patterns for engaging in occupations. Their model was created through a needs-based approach which describes how basic psychological needs associated with a meaningful life must be met in order to achieve optimal functioning and well-being (Ryff, 1995 as cited in Matuska & Christiansen, 2008). One dimension of the model describes how rewarding and self-affirming relationships with others provide meaning and fulfillment. The model for lifestyle balance and its respective dimensions reflects similarities to the findings from the current study, which indicate participation in social activities is strongly associated with overall well-being and life satisfaction. Additionally, Carstensen (2021) has contributed countless research supporting the Socioemotional Selectivity Theory (SST), and reports that small social networks are shaped toward a person's changing goals to further enhance psychological well-being. The findings from the current study support the concept from the SST that social networks are formed and maintained in alignment with individual goals to increase well-being. To further explore the SST, additional research using NHATS data can evaluate trends in social networks among Medicare beneficiaries over time and explore the relationships with well-being.

Relationships Between SDOH Measures and Well-Being

Economic stability

The SDOH domain of economic stability was measured using four items from the NHATS: receipt of food stamps, receipt of other financial assistance for meals, receipt of federal assistance to pay utilities, and section 8 or low-income housing. A response of 'Yes' to any one of those items was an indicator for low economic stability. Using these measures, the data suggest that economic stability is strongly associated with subjective well-being among community-dwelling older adults, specifically, lower economic stability was associated with a significant decrease in well-being scores among the sample. This finding aligns with results from Kaplan et al. (2008), who reported mean income was strongly and positively associated with psychological well-being among a sample of participants that was followed for over three decades. Although the current study did not use income or wealth assets to measure the economic stability of community-dwelling older adults, requiring financial assistance for basic needs, such as food, housing, or utilities, may pose risk for an individual or family to experience low economic stability or qualify for low socioeconomic status. The findings from the current study also support Anderson et al. (2019), who found positive indicators for medical or utility financial needs were significantly associated with greater depression and anxiety, lower perceived control and adaptability, and less meaning and satisfaction among a sample of community-dwelling Medicare beneficiaries.

Although the measures used for economic stability were strongly associated with well-being, the data indicated there was no mediation present when those measures were applied to each relationship between hospitalizations and well-being, self-rated health and well-being, depressive symptoms and well-being, and participation and well-being. There is sparse literature

available exploring the mediating roles of individual SDOH domains on health and well-being outcomes. However, there is literature linking constructs of the economic stability domain, such as poverty or food insecurity, to well-being outcomes (Kaplan et al., 2008; Engelberg Anderson et al., 2020; Gyasi et al., 2021). An explanation for the results of the current study may be that the measures used did not encapsulate the domain of economic stability accurately, as each domain of SDOH involves highly complex variables that are difficult to contain to a singular measurement. For the purpose of the current study, proxy measurements for SDOH domains were used based on NHATS interview categories and variables. Additionally, the measures used for economic stability do not account for those individuals who may not qualify for financial assistance for food, housing, or utilities, but who live with daily financial stressors. Being a quantitative study, the current analysis was not able to capture the full picture that a qualitative analysis might provide regarding how economic stability may impact or disrupt daily routines associated with well-being patterns among an older adult population.

Education access and quality

The SDOH domain for education access and quality was addressed using one item from the NHATS that asked respondents about the highest level of education they've achieved. The data suggest that community-dwelling older adults who received a high school education or less experienced a significant decrease in well-being compared to older adults who attended higher education. These results support research indicating educational attainment is strongly associated with improved health, by promoting healthy protective behaviors and increasing health literacy, to support individuals and families making informed, health-related decisions throughout their lifespan (Bravemen et al., 2011; Hahn & Truman, 2015). The WHO definition for health includes multiple factors other than disease or physical health condition, such as social well-

being and mental health (WHO, n.d.[b]). Although learning new knowledge and obtaining skills is a lifelong process, educational attainment plays a distinct role in providing individuals with necessary skills that contribute to overall health and well-being, including decision-making, critical thinking, self-awareness, and emotional regulation (Hahn & Truman, 2015). Additionally, the findings from the current study align with results from Prus (2011) which suggest that attaining high school education or less is strongly associated with decreased self-rated health across the lifespan in a nationally representative sample of adults in the U.S.

Although education level has been shown in the current study and other studies to be strongly associated with self-rated health and well-being, there was no mediation present when educational attainment measures were applied to the relationships between hospitalizations and well-being, self-rated health and well-being, depressive symptoms and well-being, and participation and well-being. Prus (2011) used several indicators to measure socioeconomic status from the JCUSH, including income, education, and employment status. Findings from their analysis indicate that socioeconomic status had a significant, mediating effect on the relationship between sociodemographic factors and self-rated health. SDOH are large, macro-level determinants of health, and findings from Prus (2011) suggest that measuring SDOH by individual domain may not be the most feasible approach, because they function co-dependently. For instance, in their analysis, they grouped income, education, and employment status together to collectively measure socioeconomic status, which includes two domains of SDOH. To build on the current study, future research may combine several SDOH variables to assess their direct and indirect relationships with subjective well-being or other outcomes, including participation or healthcare utilization, among community-dwelling older adults.

Healthcare access and quality

To represent the SDOH domain of healthcare access and quality, two independent variables from the NHATS were used that address access to regular healthcare services, and health literacy. Health literacy is a key characteristic of the SDOH domain of healthcare access and quality. The findings suggest that community-dwelling older adults who reported needing help understanding the doctor also reported decreased well-being compared to those who reported not needing help understanding their doctor during health visits. The findings from the current study contribute to other research supporting the association between health literacy skills and overall health and well-being outcomes (Bravemen et al., 2011; Hahn & Truman, 2015). Additionally, the findings from the current study support mediation analyses which indicate health literacy skills significantly mediate relationships between sociodemographic disparities and self-rated health among adults (Yamashita et al., 2018; Bennett et al., 2009). Similar to the research supporting the relationship between educational attainment and health outcomes, health literacy skills learned in school or over time play a significant role in empowering individuals to make informed decisions about their health (Bravemen et al., 2011). Although requiring assistance to understand the doctor was significantly associated with well-being, having access to a regular doctor was not significantly associated with improved well-being among community-dwelling older adults. This finding does not align with findings from previous studies, that support associations between access to regular healthcare services with improved health outcomes and decreased acute hospitalizations (Shi, 2012). Potential justification for this finding may be that approximately 4.4% of respondents reported not having access to a regular doctor, which is a very small sample size compared to respondents who reported having access to a regular doctor.

The sample from the NHATS is limited to Medicare beneficiaries in the United States, and does not account for older adults who do not have access to health insurance coverage.

When the healthcare access and quality variables were applied to the relationships between the independent and dependent variables, mediation was observed in the relationship between number of hospitalizations and subjective well-being. This finding suggests that health literacy and primary care access may partially influence the relationships between the number of hospitalizations and subjective well-being among older adults. The results from this study align with research supporting the strong, mediating effects of health literacy (Yamashita et al., 2018; Bennett et al., 2009), however, it remains unclear from the findings whether health literacy or primary care access mediated these relationships. Although health literacy has been documented in the literature as a strong mediator, primary care access has also been strongly associated with decreased acute hospitalizations (Shi, 2012). Future research should further examine the mediating effects of health literacy and primary care access on both self-reported and objective health outcomes to further validate their roles as mediators.

In contrast to previous studies examining health literacy as a mediator, there was no mediation found when applying health literacy variables to the relationships between self-rated health and well-being (Yamashita et al., 2018). A potential justification for this finding could be that measures for health literacy differed between the current study and previous studies measuring health literacy as a potential mediator. Yamashita et al. (2018) and Bennett et al. (2009) both used scales utilizing measures from the National Assessment of Adult Literacy (NAAL), whereas the current study used one variable from the NHATS assessing whether or not the respondent requires assistance understanding the doctor. To build on the current study,

additional measures for health literacy could be explored to assess the mediating effects on relationships between health indicators and well-being outcomes.

Social and community context

The SDOH domain of social and community context was addressed using 3 items from the NHATS that have been used in a previous study to assess perceived social cohesion of a community or neighborhood (Qin et al., 2020). The findings from the current study indicate that older adults who perceive their community as more trusting and cohesive, also experienced a significant improvement in well-being compared to respondents who did not perceive their communities as trusting or cohesive. The results from the current study support findings from previous studies that indicate the perceived social cohesion of a community or surrounding neighborhood is strongly associated with the psychological well-being of community-dwelling older adults (Cramm et al., 2012; Zhang et al., 2017). Additionally, the current study supports findings from Qin et al. (2020) who report perceived social cohesion is strongly associated with ADL or IADL limitations among a sample of community-dwelling older adults. IADLs may include activities outside the home, including driving and community mobility, shopping, participating in religious activities, and safety maintenance (AOTA, 2020). The findings from Qin et al. (2020) and the current study may provide insight on how the perceived social and community context among Medicare beneficiaries is associated with subjective well-being and participation in IADLs within the community.

Although measures for social and community context were associated with the well-being among older adults in the current study, there was no mediation present when those measures were applied to the relationships between independent and dependent variables. The findings from the current study do not align with previous studies exploring the relationships

between social cohesion of communities and the psychological well-being of older adults (Cramm et al., 2012; Zhang et al., 2017). There are few studies examining the mediating effects of community or social cohesion on relationships between several health indicators and subjective well-being among community-dwelling older adults. One study explored the relationships between living arrangements, social cohesion, and quality of life among a national probability sample of community-dwelling older adults living in rural and urban areas of China (Burnette et al., 2021). The researchers found that social cohesion was significantly associated with improved quality of life regardless of whether older adults lived alone or with family. To measure social cohesion, the researchers used a 9-item scale that also included questions pertaining to attending religious services or clubs in the community, which are similar items used to measure participation in social activities as an independent variable in the current study. Although the current study used a validated measure for social cohesion, presented in Qin et al. (2020), a degree of overlap exists between the social cohesion variables and participation in social activities, which may explain the results. An additional way to measure social cohesion or social support could be to explore social networks among community-dwelling older adults and their direct and indirect relationships with subjective well-being.

Neighborhood and built environment

The neighborhood and built environment SDOH domain was measured using 3 variables from the NHATS that have been used in previous studies to indicate neighborhood physical disorder, which is categorized as poor neighborhood/built environment in the current study (Qin et al., 2020). The results suggest that the physical conditions of the surrounding environment are not significantly associated with well-being in the sample of community-dwelling older adults after adjusting for other variables. Also, the data did not indicate the presence of mediation when the

variables were applied to the relationships between health indicators, participation, and subjective well-being. One explanation for the results of the current study could be that only 2.2% of the sample reported a positive indicator for a poor neighborhood/built environment. This finding is similar to the findings from Qin et al. (2020), who reported no significant associations between neighborhood physical disorder and ADL or IADL limitations among older adults.

The neighborhood and built environment domain includes key factors, such as availability of healthy foods, air and water quality, and prevalence of crime and violence (Healthy People 2030). A limitation of the current study is that NHATS does not ask participants regarding those key factors and characteristics of their surrounding environments, which may be an explanation for the results of the current study. There were a lot of variables that were not included in the measure for built environment, including access to continuous sidewalks, availability of public transit, or safety perceptions of built environments. Also, the 3 items used to evaluate the surrounding neighborhood were completed by the interviewer, and were not self-report from the respondents. The impacts that the surrounding, physical environment may have on individual's daily patterns and well-being has been documented in the literature (Padeiro et al., 2022; Zhang et al., 2017; Zhang et al., 2021). Additional qualitative research is needed to understand older adults' lived experiences navigating their built environments, and how their environments impact their physical, mental, and social well-being.

Implications and Suggestions for Future Research

The results from the current study indicate that hospitalizations, depressive symptoms, self-rated health, and participation in social activities are associated with subjective well-being among a nationally representative sample of community-dwelling Medicare beneficiaries. In addition, indicators for SDOH domains, including economic stability, education, healthcare, and

community context were significantly associated with well-being in the current study. These findings contribute to a growing body of literature exploring relationships between several factors and well-being among older adults using large data sets. The results of the study should be interpreted with caution, as there were several limitations to the study.

The NHATS participant population consists of Medicare beneficiaries ages 65 and older in the United States. Therefore, the current study does not account for populations of older adults who do not have access to Medicare or health insurance coverage. Inadequate or lack of health insurance coverage serves as a large barrier to accessing healthcare and preventative healthcare services, which negatively impacts health outcomes and contributes to health disparities (Healthy People, 2030, n.d.[c]). Therefore, an opportunity for future research is to explore relationships between healthcare utilization and well-being among uninsured populations. The current study was a cross-sectional data analysis, which captures relationships between variables at a set point in time. To build on this study, future research using longitudinal data from the NHATS will provide additional insight to how well-being in older adulthood changes and is influenced by multiple factors over time. Strengths and limitations exist when using a large, quantitative data set such as the NHATS. A strength of the current study is the results can be generalized to a large and diverse population of older adults. However, quantitative data is unable to provide the detailed stores of participants' lives and daily patterns that a qualitative study can provide. Therefore, future research can build on the current study in the form of qualitative research to further understand the lived experiences of community-dwelling older adults and how well-being is impacted by several factors, including healthcare utilization, participation in social activities, depressive symptoms, or other contextual factors, including financial well-being, built environment, or community and social context.

Conclusion

Although the current study had several limitations, the significant findings from the study illustrate the importance of considering several factors that contribute to well-being of older adults. Multiple indicators of SDOH were significantly associated with subjective well-being in the sample of community-dwelling older adults, including indicators for economic stability, education, health literacy, and community context. Results from the study align with the ICF framework and the PEOP model, which describe the complex relationships between personal factors, environmental factors (including broader contextual factors, such as SDOH), and occupations, and how those relationships influence overall health and well-being outcomes (Stucki, 2005; Christiansen et al., 2015). These findings support the first hypothesis and provide insight for how health, participation, and SDOH indicators can be used in future research to identify populations of Medicare beneficiaries that may be at increased risk for occupational injustices or health inequities.

One mediating effect was observed in the final analysis when the variables for healthcare access and quality were applied to the relationships between hospitalizations and subjective well-being. Together, health literacy and primary care access eliminated the significant relationship between hospitalizations and subjective well-being, suggesting their roles as potential mediators. There was no other mediation present when individual indicators for SDOH domains were applied to the relationships between other independent variables (self-rated health, depressive symptoms, social participation) and subjective well-being. These mixed results partially support our hypothesis that SDOH variables would largely explain the effects of health and participation on subjective well-being scores. These findings should be considered with caution, as several indicators for SDOH have been documented in the literature to have mediation effects on health

and well-being outcomes. Therefore, future research is warranted to validate indicators and measures of upstream SDOH using national data sets to explore their relationships with health and well-being outcomes to support the aging population.

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APPENDIX A

FREQUENCIES FOR EACH WELL-BEING ITEM

	How often do you feel cheerful?	**N**	**%**
1	Sometimes to never	958	22.9
2	Most days	2165	51.7
3	Every day	1059	25.3
Missing		7	0.2
	How often do you feel bored?	**N**	**%**
1	Every day	123	2.9
2	Most days	195	4.7
3	Sometimes to never	3865	92.3
Missing		6	0.1
	How often do you feel full of life?	**N**	**%**
1	Sometimes to never	1438	34.3
2	Most days	1624	38.8
3	Every day	1110	26.5
Missing		17	0.4
	How often do you feel upset?	**N**	**%**
1	Every day	60	1.4
2	Most days	108	2.6
3	Sometimes to never	4013	95.8
Missing		8	0.2
	My life has meaning and purpose.	**N**	**%**
1	Agree not at all	93	2.2
2	Agree a little	696	16.6
3	Agree a lot	3375	80.6
Missing		25	0.6
	I feel confident and good about myself.	**N**	**%**
1	Agree not at all	69	1.6
2	Agree a little	684	16.3
3	Agree a lot	3419	81.6

Missing		17	0.4
	I gave up on improving my life a long time ago.	**N**	**%**
1	Agree a lot	481	11.5
2	Agree a little	799	19.1
3	Agree not at all	2862	68.3
Missing		47	1.1
	I like my living situation very much.	**N**	**%**
1	Agree not at all	154	3.7
2	Agree a little	625	14.9
3	Agree a lot	3396	81.1
Missing		14	0.3
	Other people determine most of what I can/can't do.	**N**	**%**
1	Agree a lot	469	11.2
2	Agree a little	944	22.5
3	Agree not at all	2736	65.3
Missing		40	1.0
	When I want to do something, I find a way.	**N**	**%**
1	Agree not at all	64	1.5
2	Agree a little	455	10.9
3	Agree a lot	3659	87.3
Missing		11	0.3
	I have an easy time adjusting to change.	**N**	**%**
1	Agree not at all	540	12.9
2	Agree a little	1602	38.2
3	Agree a lot	2022	48.3
Missing		25	0.6

APPENDIX B

FREQUENCIES FOR EACH SOCIAL PARTICIPATION ITEM

	Do you ever visit friends or family?	**N**	**%**
1	Yes	3541	84.5
2	No	641	15.3
Missing		7	0.2
	Do you ever attend religious services?	**N**	**%**
1	Yes	2461	58.7
2	No	1727	41.2
Missing		1	0.0
	Do you attend clubs or group activities?	**N**	**%**
1	Yes	1623	38.7
2	No	2562	61.2
Missing		4	0.1
	Do you ever go out for enjoyment?	**N**	**%**
1	Yes	3239	77.3
2	No	947	22.6
Missing		3	0.1

APPENDIX C

FREQUENCIES FOR EACH SOCIAL AND COMMUNITY CONTEXT ITEM

	People know each other well.	**N**	**%**
1	Do not agree	695	16.6
2	Agree a little	1722	41.1
3	Agree a lot	1690	40.3
Missing		82	2.0
	People are willing to help one another.	**N**	**%**
1	Do not agree	338	8.1
2	Agree a little	1393	33.3
3	Agree a lot	2330	55.6
Missing		128	3.1
	People can be trusted.	**N**	**%**
1	Do not agree	357	8.5
2	Agree a little	1133	27.0
3	Agree a lot	2497	59.6
Missing		202	4.8