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ADBI Working Paper Series

EXPLORING THE LINK BETWEEN SOCIAL PARTICIPATION, FUNCTIONAL HEALTH, AND DEPRESSION AMONG OLDER ADULTS

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Asian Development Bank Institute

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Abstract

The growing number of older adults due to the demographic transition has brought about a complex change in health and disease patterns. Depression is common among older adults. linked to cognitive impairment and reduced physical activity. Little is known about the relationship between social participation, functional health, and depression in the older adult population. Therefore, this study used data from the WHO-SAGE Wave 2 (2015) survey and analyzed a sample of 7,118 older adult respondents from India aged 50 and above. The results revealed that considering functional health (WHODAS) as a mediator, it is evident that with improving functional health and a high level of access to social participation, depression among older adults is reduced. High levels of social participation and improved functional health are associated with a lower risk of depression among older adults. The study also found that older adults residing in rural areas and those that are divorced, separated, or widowed are at a higher risk of depression. Additionally, tobacco consumption is positively associated with the risk of depression among older adults. These findings emphasize the importance of social participation and functional health in reducing the risk of depression among older adults. The study suggests that physical activity and social capital are crucial for successful aging. The study recommends that older adults should engage in physical activity and participate in structured programs supported by peer groups and community participation. Living in a society with strong social networks and a supportive environment can also reduce the risk of depression among older adults.

Keywords: social participation, functional health, mental health, older adults, India

JEL Classification: J14, I12, I18, I10

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1. INTRODUCTION

The aging population is a significant demographic concern in the 21st century. The epidemiological transition causes complex shifts in health and disease patterns. impacting the economy via interactions with demographic and social factors. This epidemiological transition was initially observed in developed countries but has been routed to developing nations, including India (Omran 1971). India has surpassed the People's Republic of China (PRC) as the world's most populous country with a population of 1.4 billion, including more than 104 million older adults aged 60 and above, according to the 2011 census, and the older population is expected to grow rapidly in the coming decades (Bloom, Canning, and Fink 2010). The demographic trend shows that the percentage of older adults in India has increased over time, ranging from 5.6% in 1961 to 8.6% in 2011. According to projections by the United Nations Population Division, by 2050, 34% of India's population will be aged 50 years and above. Given the rapid development in India and the rise in the older adult populations, two distinct characteristics of population aging are evident: the growing number of older adults and the accelerating pace of population aging compared to the level of economic development. With the acceleration of social changes, a growing number of older adults worldwide are experiencing negative emotions, which result in poor coping mechanisms and an increased risk of chronic diseases and mortality, ultimately compromising their well-being (Berkman et al. 2000; Cohen, Underwood, and Gottlieb 2000: Kawachi and Berkman 2001: Fredrickson and Joiner 2002; Almedom 2005; Newall et al. 2013).

Chatterij et al. 2008 forecast a shift in the burden of diseases to older adults aged 50 and above in India by 2030, comprising nearly half of the country's total population. This increase can be primarily attributed to noncommunicable diseases (NCDs), namely chronic conditions characterized by their long-lasting and gradual progression. These ailments are often called "lifestyle diseases" because many of them can be prevented (WHO 2021). The key contributing factors for NCDs include tobacco use (smoking), alcohol consumption, unhealthy diets (high in sugar, salt, saturated fats, and trans-fatty acids), and physical inactivity. There has been significant public attention given to the primary health issues affecting older adults, including chronic diseases, disabilities, mental disorders, and depression. Upon entering old age, seniors experience a decline in physical functioning and transforming family roles, such as changes in family dynamics, widowhood, alterations in social status, retirement, and modifications in leisure activities. Failure to adapt to these changes leads to anxiety, depression, and even suicide in the worst cases. Various studies explore how the aging process can be productive and successful (Pengpid and Peltzer 2021; Irshad et al. 2023; Bandyopadhyay and Singh 2023). Rowe and Kahn's (1987) concept of successful aging is characterized by robust physical, social, and psychological well-being during old age, without any barrier of significant illnesses. Fuchs et al. (2013) further elaborate on this, delineating successful aging as not only reaching a certain age but also being free from chronic ailments, maintaining independence in daily tasks, experiencing overall wellness and quality of life, actively engaging in social interactions, managing mild cognitive or functional challenges, and experiencing minimal to no disability. According to Pengpid and Peltzer (2021), almost one in three older adults in India are aging successfully. Besides being disease-free and physically healthy, older adults need better social capital for successful aging (Muhammad, Kumar, and Srivastava 2022).

Social capital theory states that individuals enhance their social capital by engaging in social participation (Almedom 2005). It is believed that these social networks and participation contribute to better individual health through the provision of emotional and material support (Borgonovi and Andrieu, 2020). Socioemotional selectivity theory suggests that people have diverse personal needs and resources, and social participation involves meeting these needs through the exchange of resources (Croezen et al. 2015). Similarly, activity theory proposes that staying physically, socially, and mentally active is crucial for the well-being and satisfaction of older adults (Kumar et al. 2016; Amagasa et al. 2017). Theory emphasizes the importance of continued involvement in meaningful activities and relationships to counteract the negative effects of aging and to promote a positive and fulfilling older adulthood. Social participation is primarily based on establishing and maintaining social relationships, exchanging resources, and engaging in various social activities, emphasizing the significance of contact and interaction with others to derive personal value from these interactions (Almedom 2005; Borgonovi and Andrieu 2020; Croezen et al. 2015).

2. LITERATURE REVIEW

Over the past five decades, epidemiology research has primarily focused on comprehending the sociodemographic factors associated with depression and aging originating from the seminal work of Rosow and Breslau (1966). Beekman et al. (1995) conducted a community-based study exploring the prevalence and risk factors of depression among older adults. Their findings revealed that minor depression often arises due to the ordinary stresses experienced in later life. Blazer et al. (1991) and Blazer (2000) conducted extensive and representative studies involving young and old individuals, controlling for essential variables that could distort the link between older age and depression, and suggested that advancing age, female gender, lower income, physical disability, cognitive decline, and inadequate social support are all factors correlated with depressive symptoms. Other factors associated with depression include reduced abilities in activities of daily life (Ann 2005) and the absence of social support (Yoo, Lim, and Yoo 2002; Bak and Kim 2010). A study by Buvneshkumar, John, and Logaraj 2018 showed that women were at comparatively higher risk than men of being depressed. Kuiper et al. (2015, 2016) explore different aspects of social relationships and their correlation with cognitive deterioration in the broader community. Their findings indicate that inadequate social engagement is on a par with recognized risk factors for dementia, including limited educational background, physical inactivity, and depression in later life. A study by Dao et al. (2018) examines the impact of risky health behaviors on depressive symptoms and reveals that individuals abstaining from alcohol exhibit higher and more pronounced levels of depression than those who consume alcohol. They classify depression levels as normal, mild, moderate, and severe. Bergdahl et al. (2007) and Caravanni et al. (2012) demonstrated that women are at a relatively higher risk than men of experiencing depression. Similarly, Yan et al. (2011) argue that the prevalence of depression is influenced by marital status - they found that widowed older adults had a higher risk of developing depression than those with a spouse. A study by Chanda and Mishra (2019) demonstrates that mental health among older adults can be improved by greater participation in work and social activities.

Functional health, which encompasses physical activity, physical fitness, and leisure time physical activity, is a term commonly used in social sciences and literature, which use the terms interchangeably to refer to physical activities performed at work or during play, household chores, travel, or leisure time. Chen, Zeng, and Fang (2022) present findings demonstrating a positive correlation between older individuals' social

participation patterns and living arrangements and their mental well-being. They argue that various factors, such as age, gender, education, marital status, self-assessed health, and limitations in daily activities, influence these patterns of social engagement. A common pathway to depression among older adults includes biological, psychological, and/or social factors and may be due to a lack of physical activity (Fiske, Wetherell, and Gatz 2009). The impact of social participation on leisure time physical activity levels may be moderated by increased peer pressure and encouragement to engage in physical activities among individuals with higher levels of social involvement. A study conducted in a Japanese community shows that residing in an area characterized by strong social cohesion is linked to a reduced risk of developing functional disabilities among older adults (Noguchi et al. 2019).

Social participation, i.e., engaging in social activities, enhances both functional capacity and overall well-being. On the other hand, diminished functional ability can hinder an individual's capacity to sustain social connections (Avlund et al. 2004). Social support encompasses various individuals within one's social network, including family members, friends, acquaintances, caregivers, and significant others, who enhance an individual's capacity to cope with daily activities and life events (Bishop, Martin and Poon 2006). The influence of social engagement on the frequency of leisure time physical activity may be mediated by a heightened level of encouragement or peer pressure experienced by those with active social lives. Living with a regular illness can significantly impede an individual's engagement in community activities, such as employment, parenting, intimate relationships, leisure pursuits, and community involvement (Gignac et al. 2013). Research indicates that older adults are more prone to reporting persistent health concerns, leading to reduced physical activity levels and limitations in participating in various roles compared to their younger counterparts (Fuchs 2013). A longitudinal study conducted in Taipei, China suggests that policy and programs should encourage social activities among older adults to promote successful aging and mental health. The overarching aspiration of life is to attain happiness; that state is influenced by heterogeneous factors, including individual characteristics, psychological well-being, physical activity, social engagement, economic status, religious beliefs, spiritual practices, and cultural context (Argyle 2013; Mishra and Sekher 2022; Midha and Singh 2023). Environments that facilitate physical accessibility, mobility, emotional connections, independence, and active participation in social interactions enrich older adults (Fredrica Nyqvist 2015). It is well established that depression and physical health are associated, and similarly there is an association between social participation and depression. The premise of this current research is that a triad relationship between depression, functional health, and social participation exists. There is a need to understand how social participation can influence older adults to be physically active and reduce their risk of developing the disease.

3. DATA AND METHODOLOGY

3.1 Description of Variables

Depression: Information about feeling sad or empty, anxious, lack of concentration, loss of appetite, issues related to sleep, suicidal feelings, and losing interest in most things such as personal relations, work, or hobbies. Such information can be indicative of being depressed. A total of 18 questions were asked, and two sets of variables were computed from these questions. The first set was constructed using questions covering, for example, whether in the last 12 months the respondents had felt sad; lacked interest in relationships, work, or hobbies; were tired all the time; had low

energy; and had a decline in sex drive. The second set was constructed using questions about anxiety, negativity, loss of sleep, difficulty concentrating, etc. The depression questions were based on the World Mental Health Survey version of the Composite International Diagnostic Interview with diagnoses using the International Classification of Diseases (10th revision) Diagnostic Criteria for Research. The responses provided for the mental health questions can be utilized as input for a depression algorithm, which determines whether individuals have experienced major depression (MD) or not.

Functional Health: Functional health, as defined by the World Health Organization (WHO), encompasses the assessment and classification of human functioning, disability, and health. The WHO Disability Assessment Schedule (WHODAS 2.0) serves as a practical and versatile assessment tool capable of evaluating health and disability across both population-based and clinical settings. This study utilized WHODAS 2.0 to measure functional health, covering six domains: cognition, mobility, self-care, interpersonal skills, life activities, and participation.

In total, 12 items were incorporated into the scale to assess the difficulty level experienced in performing activities over the previous 30 days. Participants responded on a Likert scale, ranging from no difficulty to severe difficulty or inability to perform the activity. The scores from these 12 items were aggregated to generate a composite score, which was then transformed into a scale ranging from 0 to 100, with higher scores indicating more significant disability. These items encompassed basic activities of daily living (e.g., standing and dressing) and instrumental activities of daily living (e.g., acquiring new skills, engaging in community activities, and household chores).

Social Participation: During the SAGE Wave 2 survey, participants were explicitly questioned regarding their affiliation with various groups, organizations, networks, or associations, individually or as part of their household. These affiliations could encompass formally structured groups or informal gatherings for activities or discussions. The social participation inquiries centered on the respondents' engagement in social activities within the previous 12 months. These activities covered a range of aspects, including bonding, bridging, linking, general trust, personal trust, and perceptions of safety. Response options on a Likert scale included "never, once or twice per year, once or twice per month, once or twice per week."

3.2 Data Source

The WHO Multi-Country Surveys team initiated the Study on Global Ageing and Adult Health (SAGE) as a comprehensive data collection program aimed at gathering detailed information on the health and well-being of global populations. Data pertinent to this objective were sourced from the WHO-SAGE Wave 2 (2015) survey, which surveyed 7,118 older individuals residing in India. The sampling design aimed to procure a nationally representative cohort of individuals aged 50 and older, supplemented by a smaller cohort of individuals aged 18 to 49 for comparative analysis. The individual questionnaires predominantly targeted adults aged 50 and above.

3.3 Methodology

In the preliminary analysis, the association between depression and types of social participation, such as general trust, personal trust and safety, activity indicators, and background characteristics, is analyzed. Secondly, regression models are fit for the mediator and outcome. The mediator model involves the treatment variable, e.g.,

functional health, and the relevant pretreatment covariates. Depression is modeled as a function of the mediator. In this study, a logit model was employed to analyze the data. A mediator model was used to generate two sets of predictions for the mediator, one for the treatment group and the other for the control group. Other nonlinear models, such as logit or probit models, or semiparametric models, such as generalized additive models, could have also been used. Considering WHODAS as a mediator, the model is regressed with depression as the outcome variable. Thus, this model hypothesizes that social participation affects functional health, which in turn affects depression among older adults. This study uses the traditional approach of a single mediator, as explained in Figure 1. The mediator variable (functional health) and the predictor (social participation) are continuous variables, whereas the outcome variable (depression) is binary.



Figure 1: Conceptual Diagram of Mediation Analysis

Note: FH = functional health, SP = social participation, D = depression, c = direct effect, a and b = indirect effect. Total effect is the sum of the indirect and direct effect. Source: Authors.

Table 1 shows the percentage distribution and odds ratio of depression by social participation and different background characteristics among older adults. Depressed older adults, on average, had a social participation score of 0.08 (0.35). Unadjusted and adjusted regression findings demonstrate that older adults with high social participation were more likely to be depressed. Older adults residing in rural areas (OR: 1.44 [95%CI: 1.21, 1.72]) were more likely to be depressed than those residing in urban areas. Separated/widowed/divorced older adults were more likely to be depressed (OR: 1.32 [95% CI: 1.14, 1.54]) than those who were married. Tobacco consumption was positively associated with depression. Difficulties with ADL were positively and significantly associated with the risk of depression among older adults. Older individuals who had difficulty with any one ADL had a 1.81 times elevated risk of developing depression compared to those who had none. Similarly, there was found to be a 2.18 times higher risk of developing depression among those facing difficulties with two or more ADLs compared to older adults with no activity limitations.

			Model 1	Model 2
_	Depres	ssion	Depression (No)®	Depression (No)®
Characteristics	No	Yes	Odds Ratio [95% CI]	Odds Ratio [95% CI]
Social participation	-0.01	0.06	1.62 (1.39, 1.89) ***	1.52 (1.29, 1.80) ***
Mean (sd)	(0.41)	(0.37)		
Age (years)				
50–59	83.33	16.67		Reference
60–69	82.35	17.65		1.04 (0.9 1.2)
70–79	81.08	18.92		1.14 (0.96 1.36)
80 and above	74.55	25.45		1.44 (1.09 1.9) **
Sex				
Male	83.73	16.27		Reference
Female	80.66	19.34		1.19 (1.02 1.39) **
Place of residence				
Urban	86.14	13.86		Reference
Rural	80.52	19.48		1.47 (1.23 1.75) ***
Education Level				
Illiterate	80.47	19.53		Reference
Up to Primary	81.09	18.91		1.18 (1.01 1.37) **
Up to Secondary	85.55	14.45		1.06 (0.87 1.29)
College	89.38	10.62		0.8 (0.56 1.13)
Household Wealth Quintile				
Poorer	78.44	21.56		Reference
Poor	79.67	20.33		0.99 (0.82 1.2)
Medium	81.74	18.26		0.88 (0.73 1.07)
Rich	83.23	16.77		0.83 (0.68 1.01)
Richer	86.57	13.43		0.93 (0.76 1.14)
Marital Status				
Married	83.56	16.44		Reference
Separated/Widowed/Divorced	77.84	22.39		1.36 (1.17 1.57) ***
Tobacco use				
No	83.64	16.36		Reference
Yes	79.05	20.95		1.47 (1.28 1.68) ***
Total	82.12	17.88		. ,

Table 1: Logistic Regression Showing Factors Affecting Depression Among Older Adults (n = 7118)

Note: *** = p < 0.01, ** = p < 0.05, * = p < 0.1.

4. RESULTS

Table 2 shows the mean score of the index for the WHO Disability Adjusted Score (WHODAS); the higher the score, the greater the functional limitations among older adults. On average, older adults had a WHODAS of 28.73 (19.53). The mean value for cognitive social participation is 0.01, with a median of 0.03 and a standard deviation of 0.10. With increasing age, the mean WHODAS values were found to be increasing; they were highest for the 80 years and above age group (44.73) and lowest for the 50–59 years age group with a mean value of 23.68. Females had a higher WHODAS value (31.27) than their male counterparts (25.85). The WHODAS for rural areas is higher (29.77) than that in urban areas (24.89). An inverse relation was found between the level of education and the WHODAS. With an increasing level of education, the

WHODAS declines. Similarly, with a rising socioeconomic status, the score is found to be decreasing. Widowed/divorced/separated older adults had a higher (34.98) WHODAS than those who were married (26.71).

	WHO DAS	
Characteristics	Mean	Standard Deviation
Social participation		
Age		
50–59	23.68	17.34
60–69	29.04	18.98
70–79	35.27	20.15
80 and above	44.73	22.34
Sex		
Male	25.85	19.29
Female	31.27	19.39
Place of Residence		
Urban	24.89	19.54
Rural	29.77	19.39
Education		
Illiterate	32.22	19.35
Up to Primary	27.96	19.24
Up to Secondary	22.27	18.13
College	21.14	18.64
Household Wealth Quintile		
Poorer	32.68	19.60
Poor	31.31	19.24
Medium	28.69	19.80
Rich	26.38	19.27
Richer	25.55	18.86
Marital Status		
Married	26.71	18.59
Widowed/Divorced/Separated	34.98	20.91
Total	28.73	19.53

Table 3 shows the mediating effects of functional health (WHODAS) on the association between social participation and depression. Firstly, the association between functional health (WHODAS) and social participation and background characteristics is analyzed. In the second step, the mediating role of functional health is used into the model to explain the association between social participation and depression. Social participation is negatively associated with the WHODAS; functional health is likely to improve with more social involvement. With increased age, the limitations on activities are expected to rise. Older female adults and those residing in rural areas are more likely to report worse functional health. Older adults with better socioeconomic status and higher education levels are less likely to have functional limitations. Tobacco consumption is positively associated with the WHODAS.

Considering functional health (WHODAS) as a mediator in the second step, it is evident that with improving functional health and a high level of access to social participation, depression among older adults is reduced. Older adults residing in rural areas are at

greater risk of depression through the mediating impact of functional health. Taking into account of the mediation role of functional health, divorced/separated/widowed older adults are more likely to suffer from depression. Further, tobacco consumption is positively associated with the risk of depression, considering the mediating effect of functional health.

Wł	HODAS Score (Mediator)		Coefficients		
Social participation (tre	atment)		-2.34 (-3.45, -1.23) ***		
Age 60–69			5.49 (4.52, 6.47) ***		
Age 70–79			11.42 (10.18, 12.67) ***		
Age 80 and above			21.13 (19.02, 23.23) ***		
Sex (Female)			5.47 (4.39, 6.55) ***		
Place of residence (Ru	ral)		2.61 (1.49, 3.74) ***		
Education-Up to primar	ry level		-1.09 (-2.16, -0.01) ***		
Education-Up to secon	dary level		-4.99 (-6.34, -3.64) ***		
Education-Graduate an	nd higher		-5.81 (-7.89, -3.73) ***		
Wealth-Poor			-0.77 (-2.15, 0.62) ***		
Wealth-Medium -2.71 (-4.11, -1.31) ***		-2.71 (-4.11, -1.31) ***			
Wealth-Rich -4.6 (-5.98, -3.22) *** Wealth-Richer -3 53 (-4.97, -2.08) ***		-4.6 (-5.98, -3.22) ***			
Wealth-Richer			-3.53 (-4.97, -2.08) ***		
Wealth-Richer -3.53 (-4.97, -2.08) *** Marital-Widowed/divorced/separated 2.45 (1.38, 3.52) ***		2.45 (1.38, 3.52) ***			
Tobacco			1.13 (0.17, 2.1) ***		
Depression (Outcome	e Variable)		Coefficients		
WHODAS Score (Medi	ator)		0.01 (0.01, 0.01) ***		
Social participation (tre	eatment)		0.26 (0.17, 0.35) ***		
Age 60–69			-0.06 (-0.14, 0.03)		
Age 70–79	Coutcome Variable) Coefficients core (Mediator) 0.01 (0.01, 0.01) *** ipation (treatment) 0.26 (0.17, 0.35) *** -0.06 (-0.14, 0.03) -0.08 (-0.18, 0.03) above -0.06 (-0.23, 0.1)) 0.03 (-0.06, 0.12) dence (Rural) 0.19 (0.09, 0.29) *** o to primary level -0.08 (-0.2, 0.03)				
Age 80 and above	je 70-79 -0.08 (-0.18, 0.03) je 80 and above -0.06 (-0.23, 0.1)		-0.06 (-0.23, 0.1)		
Sex (Female)			0.03 (-0.06, 0.12)		
Place of residence (Rural)			0.19 (0.09, 0.29) ***		
Education-Up to primary level			-0.08 (-0.2, 0.03)		
Education-Up to secondary level			0.01 (-0.1, 0.12)		
Education-Graduate an	nd higher		-0.14 (-0.33, 0.05)		
Wealth-Poor			-0.01 (-0.13, 0.11)		
Wealth-Medium	Vealth-Medium -0.01 (-0.12, 0.11)		-0.01 (-0.12, 0.11)		
Wealth-Rich	th-Rich –0.05 (–0.17, 0.06)				
Wealth-Richer	th-Richer $-0.06 (-0.17, 0.06)$				
Marital-Widowed/divord	larital-Widowed/divorced/separated 0.15 (0.06, 0.23) ***		0.15 (0.06, 0.23) ***		
Tobacco			0.21 (0.13, 0.29) ***		
Source	Sum of Square	Degree of Freedom	Mean Sum of Squares		
Model	381,368.45	8	47,671.06		
Residual	2,273,327.9	6,988	325.32		
Total	2,654,696.35	6,996	379.46		
F(8, 6988)	146.54 ***				
R-squared	0.1447	Adj R-squared	0.1436		

Table 3: Coefficients of the Mediating Effect of Functional Healt
on the Association Between Social Participation and Depressio

Note: *** = p < 0.01, ** = p < 0.05, * = p < 0.1.

Figure 2: Average Causal Mediation Effect as a Function of the Degree of Violation of Sequential Ignorability Assumption with Depression as the Outcome



Figure 2 shows that the correlation between the error term is 0.2. The coefficient of determination, which is used to explain the extent of variability of one factor that can be caused by its relationship to another factor, is 27.0% for social participation (mediator) and the WHODAS (outcome linear model). In contrast, the association for social participation (mediator) and the WHODAS (outcome probit model) is 8% (please refer to Appendix A1 for table).

5. DISCUSSION AND POLICY RECOMMENDATIONS

Functional health is vital in aging populations, as it directly affects an individual's ability to maintain independence as age increases. Functional health encompasses physical, cognitive, and emotional aspects of health that collectively enable a person to carry out routine tasks and engage in meaningful activities. The results from past studies and our results indicate that functional health acts as a mediator between social participation and well-being of older adults that plays a significant role in maintaining independence and preventing disability or diseases (Glei et al. 2005; Glass and McAtee 2006; Freedman and Spillman 2014; Choi et al. 2021). It has been observed that older adults with better functional health have a lower likelihood of suffering from a disease. The findings suggest that improved social participation and better functional health contribute to a reduced risk of developing depression among older adults (Irshad et al. 2023; Pengid and Peltzer 2021). On the other hand, leading a sedentary lifestyle and not engaging in physical activity can worsen health conditions and make it more challenging to perform daily activities. After accounting for socioeconomic variables, the statistical analysis confirms that the mediation effect of functional health is significant in reducing the likelihood of developing depression.

Better trust norms and networks can improve the efficiency of society by facilitating coordinated actions and interaction between people (Glass and McAtee 2006). This study also establishes the evidence that older adults with better social participation among friends, community, and society are at a lower risk of developing depression,

given that it is mediated with better physical activity. However, females are still at risk of developing depression despite having better social participation and functional health, which may be for biological reasons (Carayanni et al. 2012).

Mental health conditions improve with better social capital participation among older adults, becoming even stronger when accompanied by better functional health. Studies have demonstrated that individuals who engage in social activities, such as spending time with friends and family, participating in community groups, volunteering, or attending religious events, are at lower risk of mental health issues than those who do not participate in these types of activities (Glei et al. 2005; Midha and Singh 2023). Studies also show that older adults with limited networks or low social capital levels have more severe symptoms of depression (Kawachi and Berkman 2001; Cornwell and Waite 2009; Fredrica Nyqvist 2015; Amegbor et al. 2020). Studies indicate that with rising age, residing in urban areas, and having lower socioeconomic status, the likelihood of developing symptoms of depression increases (Dao et al. 2018). This study also proves that with good functional health and a strong sense of trust and safety towards society, the effect of age, gender, place of residence, and socioeconomic conditions becomes minimal in developing depression at older ages.

There is a higher level of dependency among isolated or living-alone older adults because of retirement, loneliness, and/or health issues; hence, such older adults need care support for a better quality of life (Ong, Uchino, and Wethington 2016). Thus, the current study fills a critical gap by understanding the effect of social participation on the life of older adults. More precisely, our study clarifies social capital among older adults in a broader sense. Further, the importance of functional health for successful aging is explained. With their increasing dependency (economic and social support), older adults prefer to stay with their family. Irrespective of age, gender, and socioeconomic conditions, better functional health and strong social capital can lead to a healthy life among older adults (Djundeva, Dykstra, and Fokkema 2019; Chanda and Mishra 2019). This study further suggests that with enhanced social participation and better functional health, older adults can live a disease-free life with reduced chances of developing disease (Heesch and Brown 2008). Thus, older adults must be encouraged to be more physically active as it leads to better health conditions. It is advised that physical activity among older adults is important to stay physically fit, putting them at less of risk of developing disability and diseased conditions. It can further be suggested that participating in a structured physical activity encouraged by peer groups and community participation can lead older adults to live a better quality of life. Older adults must stay in society with better social networks, as this may promote easy and fast diffusion of health-promoting strategies and policies. A trustful and supportive environment with better interaction among people may not only reduce loneliness but also help to achieve better physical and mental well-being.

The findings of this study have significant implications for designing targeted interventions aimed at promoting the mental well-being of older adults through enhanced social participation and functional health. These implications extend to both healthcare interventions and community programs, offering actionable insights into improving the quality of life for the aging population. Thus, community programs such as, opening senior clubs, organizing a variety of recreational activities, group activities, educational workshops, intergenerational programs, religious events, and community gardens are encouraged for social participation and integration of older adults. These events can facilitate meaningful social interactions, build strong support systems, and combat social isolation. Collaborative efforts with healthcare providers can ensure that these programs also address functional health aspects, promoting physical activity and functional independence within the community. The study

emphasizes the importance of engaging in social activities; these events can help create inclusive and engaging environments that foster social participation and enhance the well-being of their residents.

The study highlights the significant role of functional health in reducing the risk of depression among older adults. Therefore, policymakers and advocacy groups can utilize the research outcomes to call for policies prioritizing older adults' mental well-being. The evidence supporting the positive impact of social participation and functional health underscores the need for policies that create age-friendly environments. This could involve initiatives aimed at enhancing public spaces, promoting accessible transportation, and establishing age-sensitive healthcare services. By integrating mental health support, physical activity opportunities, and social engagement into urban planning and policymaking, communities can be better equipped to support their older adults. It is recommended that older adults engage in physical activity and participate in structured programs supported by peer groups and community participation.

Living in a society with strong social networks and a trustful and supportive environment can reduce the risk of depression among older adults. Policymakers should focus on improving access to healthcare, promoting health awareness, and fostering trust and supportive environments among the older adult population. Geriatric care models can integrate the study's findings into comprehensive care plans for older adults. Health practitioners can collaborate with social workers, psychologists, and other professionals to offer holistic care that addresses physical health, mental well-being, and social connectedness. By focusing on preventive measures that promote functional health and encourage social interactions, geriatric care providers can potentially mitigate the risk of depression and improve the overall quality of life for their patients.

6. CONCLUSION

This study underscores the pivotal role that social participation and functional health play in mitigating the risk of depression within the older adult demographic. Enhanced social engagement and functional well-being correlate with healthier, disease-free lives among older individuals. The findings emphasize the significance of physical activity and social capital as key elements for achieving successful aging. To this end, policymakers are crucial in fostering healthier aging outcomes. By instituting physical activity programs, bolstering social engagement, expanding healthcare accessibility, raising health awareness, and cultivating a trusting and supportive environment, policymakers can significantly strengthen the physical and mental well-being of older adults, thereby diminishing the likelihood of depression.

Moreover, the study reveals the robust influence of functional health as a mediator in the relationship between social participation and disease conditions. The substantial mediation effect of functional health significantly decreases the probability of developing depression. Thus, it is recommended that older adults actively engage in physical activities and participate in structured initiatives facilitated by peer groups and community involvement. Additionally, residing in communities with robust social networks and a nurturing and trustworthy atmosphere is encouraged to promote enhanced physical and mental well-being.

However, it is essential to acknowledge certain limitations and avenues for future research. The current study primarily concentrated on a specific cultural and geographic context, thereby limiting the generalizability of its findings. Moreover, while the study examined the mediating role of functional health, it did not delve extensively into the various moderating and mediating factors that could intricately influence the relationship between social participation, functional health, and depression, Future investigations should encompass more diverse and sizable samples, employing longitudinal designs to delve into these variables' temporal and causal associations over time to enhance the understanding. Incorporating objective measures and biomarkers can further deepen the comprehension of these constructs and mitigate potential biases. Moreover, intervention studies are a promising avenue for future exploration, offering insights into the effectiveness of programs and the specific components contributing to positive mental health outcomes. Comparative analyses could be pursued to unravel discrepancies in social participation, functional health, and depression outcomes among distinct subgroups of the older adult populace, such as urban versus rural dwellers or married versus unmarried individuals.

Despite these caveats, this study stands as a significant stepping stone in unraveling the intricate connections between social participation, functional health, and depression among older adults. By acknowledging these limitations, we lay the groundwork for future research endeavors that can build upon and refine our understanding of these critical relationships. Its implications extend beyond academia, guiding policymakers and practitioners toward interventions that empower older adults to lead more fulfilling, healthier lives while fostering communities that actively support their mental well-being.

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APPENDIX

Appendix A1: Sensitivity Results for Causal Mediation Model

ρ (correlation between error terms of both models)	ACME = 0	.2
R ² of mediator and outcome linear model	ACME = 0:	.04
R ² of mediator and outcome probit model	ACME = 0:	.0312