Jurnal Kawistara
The Journal of Social Sciences and Humanities

Vol. 15, No. 2, Agustus 2025: 215–231
https://doi.org/10.22146/kawistara.100635
https://jurnal.ugm.ac.id/kawistara/index
ISSN 2088-5415 (Print) | ISSN 2355-5777 (Online)
Submitted: 12-10-2024; Revised: 13-08-2025; Accepted: 21-08-2025

The Impact of Social Capital to the Health of Elderly: the Case Post-Tsunami Aceh in 2004

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ABSTRACT Social capital has been considered an important factor on mental and physical health. However, there is no consensus on its best measurement. This research examines the effect of informal social capital (family and community support) on the health quality of the elderly through self-assessed health status (SAHS), self-care ability (ADL), and mental health (PTSD). This study introduces the use of instrumental variable (IV) estimation to address endogeneity in evaluating social capital's effect on elderly well-being in the context of post-tsunami Aceh. Utilizing secondary data from the 2022 STAR survey, the study applies a quantitative approach with an IV probit model to analyze the impact of social capital on binary health outcomes (SAHS, ADL, PTSD). Instrumental variables include residence status, number of social networks, and life satisfaction chosen for their correlation with social capital but exogeneity with health outcomes. Tests for endogeneity, weak instruments, and over-identification were conducted to validate the analytical framework. This research found that informal social capital significantly improves physical health (SAHS and ADL) and mental health (PTSD), although community participation shows no significant association with PTSD. In conclusion, support from family and neighbors plays a vital role in enhancing elderly well-being post-disaster. Policymakers should prioritize strengthening informal support systems to improve the quality of life among the elderly.

KEYWORDS *Physical Health; Mental Health; Elderly; Iv Probit; Social Capital.*

INTRODUCTION

The Aceh tsunami on December 26, 2004, was one of the natural disasters in Indonesia with tremendous damage, reaching more than 1000 km of coastline and resulting in high casualties. The

U.S. The Agency for International Development (USAID) confirmed that the total deaths reached 152,565, with 141,955 reported missing and 1,134,978 as refugees (USAID, 2005). The beginning of the Aceh tsunami disaster was preceded by an earthquake measuring 9.0 on the Richter Scale at the bottom of the Indian Ocean (U.S. Geological Survey 2005) and then followed by a tsunami which affected several other surrounding countries such as Sri Lanka, India, Thailand, Maldives, Somalia, Myanmar and Malaysia. (WHO, 2005).

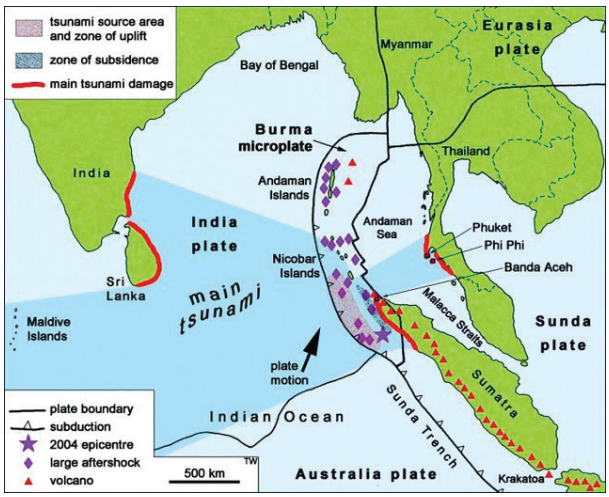

Figure 1. Areas of Aceh Province affected by the Tsunami (Waltham, 2005)

The number of casualties in the Aceh tsunami was dominated by the youngest children (0-9 years) and the elderly aged 70 years and over. Doocy et al., 2007). Various studies using STAR data show the death status at the time of the tsunami and the health status of the casualties after the tsunami. More than 70% of the sample from 2004 to 2005, the age categories of children, the elderly and adult women were more casualties of death than adult men (Gero et al., 2020). One of the groups most vulnerable to experiencing post-tsunami mental and physical health problems is the elderly (Dai, 2022). Hence, disaster recovery should focus on physical and mental health. This psychological impact can affect the health status of tsunami survivors (Stroebe et al., 2021).

Post-disaster health recovery among the elderly is a critical issue, as this group often faces both physical limitations and mental health risks. Research shows that survivors, especially older adults, tend to experience persistent physical impairments and psychological distress, such as Post-Traumatic Stress Disorder (PTSD) (Frankenberg et al., 2012; Dai & Gu, 2022).

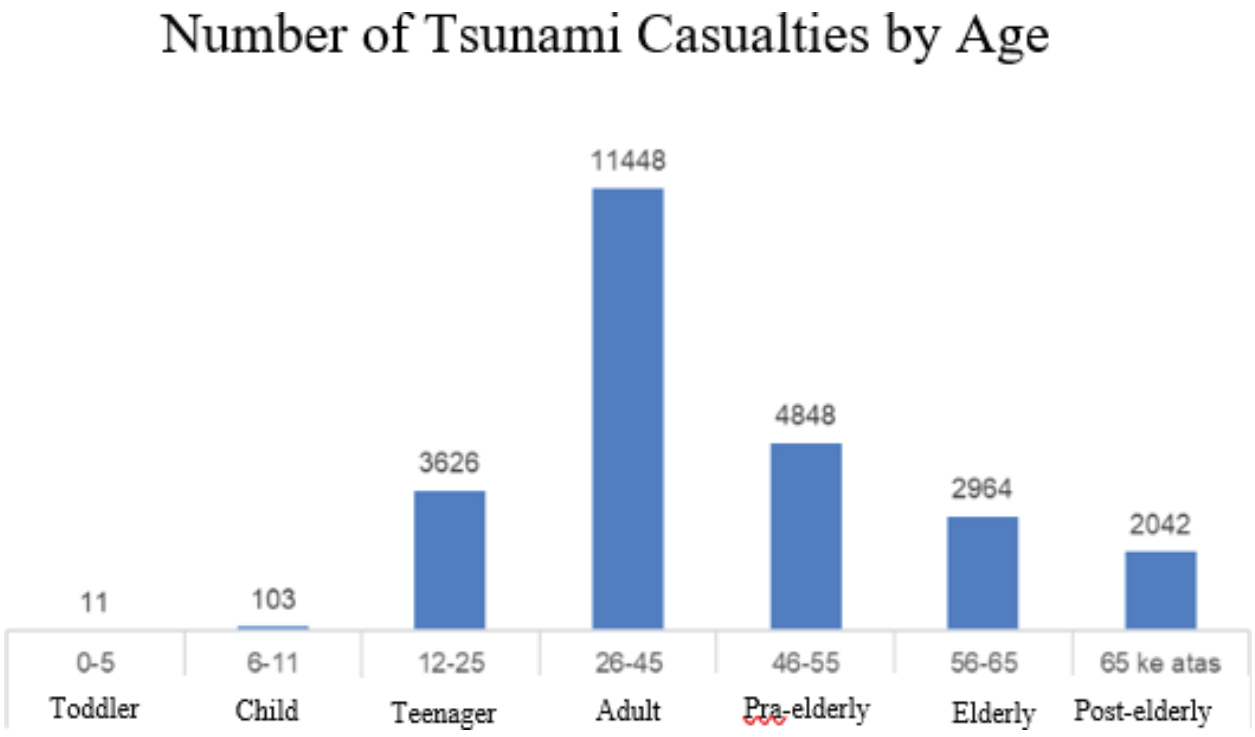

Figure 2. Number of Tsunami Disaster Casualties by Age

Source: processed from STAR data (2022)

In post-disaster contexts, social capital, the network of social connections and support systems, has been identified as a crucial factor influencing recovery and resilience (Aldrich & Meyer, 2015;). Several studies have demonstrated that social capital, particularly in the form of bonding (close ties among family and neighbors) and bridging (connections across groups), contributes to improved physical and mental health outcomes (Putnam, 1993; Cao & Rammohan, 2016). For elderly individuals, these social resources can facilitate better access to care, reduce isolation, and enhance psychological well-being (Eriksson, 2011; Liang et al., 2020).

Despite its recognized importance, the precise relationship between informal social capital and elderly health outcomes in disaster recovery settings remains underexplored, particularly in Indonesia. Prior research often lacks robust identification strategies to address endogeneity—where social capital may be both a cause and consequence of health (Xue, 2020). Moreover, many studies rely on general or cross-sectional data that limit the ability to infer causality or capture long-term effects.

Another challenge during post-disaster mitigation is the difficulty in evacuating the elderly. The Madrid International Plan of Action on Aging and the Sphere (2010) emphasized that in several cases, thetsunami disaster mitigation did not specifically target the elderly due to discrimination, lack of information, and support. On the other side, the elderly have a higher level of vulnerability. This condition is exacerbated by the inability of the elderly to meet basic needs, low quality of health, and limited resources (Miller et al., 2017). Therefore, the decreased mobility of the elderly also exacerbated the condition. House and infrastructure damages and loss of livelihoods have a long-term impact on the recovery of the economic sectors that affect disaster casualties. Moreover, humanitarian assistance only provides financial aid during disasters and cannot make natural disaster casualties survive in the post- disaster economic recovery phase (Rosario, 2020).

Frankenberg et al. (2012) stated that survivors of the Aceh and North Sumatra coastal tsunamis in 2004 experienced Post Traumatic Stress Reactions (PTSR). T Davidson & McFarlane (2006) stated that casualties in various age categories could experience prolonged stress (Ahmadi et al., 2018).

It proves that the impact of natural disasters can vary between several individual characteristics. Therefore, mitigation and rehabilitation by considering the social structure within a group are essential. The study's results found that humanitarian assistance, socioeconomic, physical, natural conditions, and social capital are crucial factors in mitigating natural disasters. Social capital has been proven to effectively minimise the impact of natural disasters (Koh, 2008). For example, when the local government had limited capacity to deal with the casualties of the 1995 Kobe earthquake, social capital in the form of assistance from the community, volunteers, relatives and friends of the casualties became very crucial in the post-disaster evacuation and recovery process (Rosario, 2020).

Previous research proved that social Social capital is a significant factor in disaster management and community resilience.

Social capital is needed by the elderly and affects three categories: physical, mental and social health. Adger et al. (2009) stated that social capital through participation in community organizations could be a form of natural disaster management. However, definite conclusions need to be drawn regarding the impact of bonding, bridging and linking in social capital on post-disaster recovery (Aldrich & Meyer, 2015). Individual health quality can be improved by increasing the quality and bonding of social capital (among friends, family and neighbours) and bridging (relationships of mutual trust between those with a spatial demographic relationship).

This social capital affects health because it can create a better social environment, easy access to information sources, and socio-economic. Various forms of social capital affect health conditions, such as social trust, membership in an organization, network, and others (Eriksson, 2011).

Social capital, elderly experience increased physical health (increased ability to carry out daily activities and decreased chance of developing chronic diseases) and mental health (Cao & Rammohan, 2016). The elderly who can maintain social relations in a community are also proven to have a better cognitive level. Previous studies on the elderly show that social capital can be a solution for mitigating and accelerating the recovery of elderly casualties. This research explores the impact of social capital to the physical and mental health of the elderly after the 2004 Aceh Tsunami

The social theories of Coleman, Putnam, and Fukuyama collectively provide a robust theoretical foundation supporting the argument that social capital is vital for elderly welfare, particularly in disaster recovery contexts like post-2004 Aceh Tsunami. Coleman theory establishes that social capital is embedded in social structures (e.g., family, community groups) and facilitates access to critical resources—such as emotional support, healthcare information, or economic aid—which are essential for elderly physical and mental health during recovery. Putnam adds nuance by distinguishing between bonding capital (strong ties with family/neighbors offering immediate emotional and practical support, reducing isolation and chronic stress) and bridging capital (connections across diverse groups enabling access to broader community resources, services, and recovery aid). Fukuyama emphasizes that the informal norms of trust and reciprocity inherent in social capital foster cooperative behaviors, ensuring communities mobilize effectively to protect vulnerable elderly, share resources, and sustain collective action for long-term rebuilding (Cao & Rammohan, 2016). Together, these theories demonstrate how social capital's structural, relational, and normative dimensions enhance resilience: they buffer mental health risks, improve access to care and necessities, maintain cognitive function through social engagement, and empower the elderly as active participants in recovery which directly linking community networks to improved health and welfare outcomes post-disaster.

Participation in society fosters personal responsibility, learning, and a sense of connection, enhancing community welfare. Critically, higher social capital correlates with reduced risks of physical and mental health issues. However, this relationship is complex, mediated by environmental, healthcare, socioeconomic, and educational factors. Its impact on health is a major interdisciplinary focus, spanning epidemiology, sociology, political science, economics, and health sciences, and is explicitly recognized by the World Health Organization (WHO) as vital for effective health policy.

To address these complexities, this study utilizes the STAR longitudinal dataset tracking tsunami-affected individuals. Employing an Instrumental Variable (IV) probit method, we estimate the *causal* impact of *informal* social capital on elderly physical health (SAHS, ADL) and mental health (PTSD). This approach accounts for potential endogeneity, providing robust evidence to advance academic understanding and inform disaster recovery and geriatric care policy.

DATA AND METHOD

This study uses secondary data of individual and household-level from STAR DATA, a longitudinal survey data specifically for casualties of the Aceh Tsunami. The data was first collected from 2005 to 2008, then the data changed where the data version in batch 1 was carried out in 2017, batch 2 in 2019, and batch 3 in 2022.

STAR is longitudinal data, so it can facilitate researchers to make long-term observations of individual behaviour (LaFave & Thomas, 2017) and observe changes in individual behaviour between periods. This study used a quantitative approach with the IV probit method. This model estimates the impact of social capital on the physical and mental health of the elderly. IV probit was chosen because the researcher want to explore probability of mental health problem occurrence and the variable suspected to be endogenous is a continuous variable.

Table 1. Definition of Variables

Variable	Level Data	Component	Questions
MentalHealth Dummy PTSD	Individual	Score ≥ 6.5 has a value of 1 if experience mild PTSD, score ≤ 6.5 0 if PTSD is severe	Q1: Since the tsunami, have you experienced ...?If yes, Q2: When you experience ... At the highest intensity,do you often feel (1) sometimes (2)or (3) very rarely? Q3 : When does it start? Q4 : Do you still feel it now? If not Q5: For how long did you feel the disturbance stop?

Variable	Level Data	Component	Questions
Physical Health Dummy Activity Daily Living (ADL)	Individual	Score 3-4 = 1 if have good ADLs, Score 0-2 = 0 if ADL is bad	a. How much difficulty in walking inside or outside the house b. How much difficulty do you have in taking care of yourself (bathing, dressing) c. Is having difficulty lifting heavy objects 20 meters d. Did have difficulty walking 5 km
Dummy Self-assessed health status (SAHS)	Individual	1 SAHS is good, 0 if SAHS is bad	a. In general, what is the current condition of both physical and mental health? b. How about your physical and emotional health inthe next 12 months?
Social Capital Kinship Relations	Individual	Number of family members who provide support (family support) and neighbors who provide support (neighbor friend support)	a. Since the Tsunami, how many people can you call/phone for emotional support if you are sad or when you need someone to talk to? b. Since the tsunami, how many have been contacted if they need financial assistance, food, or shelter? c. How many people have provided emotional support since the tsunami? d. Since the tsunami, how many have provided financial assistance, food, food or shelter?
Community Participation	Individual	1 if participate, 0 not	Since the tsunami did participate in Community activities
Log Total Expenditure	Individual	Food expenditure (a week ago) and non-food (a month ago)	During 2004, approximately how much income did you receive?
Instrument Variables	Individual	total number of family and friends	Q1: How many [...] do youhave now?Answers in numbers
Number ofsocial networks	Individual	Number of social networking	a. Son b. Daughter c. Siblings at 12 years old d. Another family member Friends/ neighbors
Dummy Life Satisfaction	Individual	1 if good 0 if bad	a. Since the tsunami, how has your family life been? b. has it changed for the better or for the worse?

Table 2. Sample Details for Each Survey Wave

Survey wave	Sample each wave	Sample ration (% total)
Wave 1 (2017)	28.152	26,12%
Wave 2 (2020)	38.178	35,42%
Wave 3 (2022)	41.451	38,46%
Total sample	107.781	100%

Source: Data processed, STARDATA

Instrument Variable

The study uses instrument variables that correlate with social capital but are not directly (simultaneously exogenous) related to physical and mental health (Cao & Rammohan, 2016). The instrument variables in this study differ because the social capital variable consists of two categories: kinship (with family, neighbours, and friends) and communityparticipation. In comparison, the dependent variable is divided into several categories: ADL and SAHS physical health and PTSD mental health. This study builds upon and modifies the model proposed by Suriastini et al. (2023). Given the potential endogeneity of social capital, an endogeneity test is conducted as a preliminary step. To address this issue, social capital is first estimated as a function of several individual-level categorical variables using instrumental variables. Since the health variable is binary, an IV probit model is used to obtain consistent and unbiased estimates.

In simple terms, the OLS or probit model in this study is:

(1) $H_{it} = \beta_0 + \beta_1 SC_{it} + \beta_2 control_{it} + e_{it}$

The simple model in this study was then developed using IV Probit:

First Stage

(2) $SC_{it} = \alpha'_{1it} + \beta'_1 IV_{it} + \beta'_2 control_{it} + e_{it}$

Second Stage

(3) $H_{it} = \alpha + \beta_1 \widehat{SC}_{it} + \beta_2 control_{it} + e_{it}$

Where SC are three variables of social capital, namely the amount of family support, the amount of support from friends or neighbours, and community participation. While IV is an instrument variable. The control variables used in this study were sociodemographics such as age, gender, marital status, house damage dummy, household consumption expenditure (food and non-food), education, and the number of family members. The dependent variable H is the health level of the elderly in the form of the dummy ADL,PTSD, and SAHS variables.

This study uses a maximum of three IVs, namely residence variables, the level of life satisfaction, and the number of networks. The selection ofinstrument variables in this study was based on the results of the endogeneity test and variousliterature studies.

First, the residence variable states whether they still live in the same place after the tsunami. It indicates that individuals who live longer will be able to interact with neighbours or friends so that they can

strengthen the bonds of social capital that exist (Hikichi et al., 2020; Seo, 2018).

Second, the number of social networks, such as the number of children, friends, and neighbours, also influences social capital. Parents who have children interact socially with neighbours more often than do not have children. The more friends, the more one's social network will increase. It also describes social capital as an asset for individuals that can provide personal benefits through social interaction. The number of social networks is more often used as a variable instrument of social capital on health, as was done by (Xue, 2020).

Third, the variable level of life satisfaction. Social capital, such as the support of neighbours and friends, is the best source of support for the health of the elderly. The level of life satisfaction is positively related to the number of social networks one has (Tomini et al. 2016). Individuals with strong bonds of social capital also tend to have higher levels of life satisfaction. It is due to the existence of social capital in the form of a sense of belonging and mutual help between individuals, which creates a feeling of security, calm, and comfort. Yuan (2015) states that there is a positive relationship between social capital and the level of life satisfaction with three aspects of structural social capital: the number of networks, the interaction between neighbours, and community participation.

Three econometric models (Self Assessed Health Status, Activities of Daily Living, and Post Traumatic Syndrome Disorder) explain social capital in various categories: family support, neighbour or friend.

(1) $$SAHS_{it} = \alpha + \beta_1 variable\ interest\ social\ capital_{it} + \beta_2 control_{it} + e_{it}$$

(2) $$ADL_{it} = \alpha + \beta_1 variable\ interest\ social\ capital_{it} + \beta_2 control_{it} + e_{it}$$

(3) $$PTSD_{it} = \alpha + \beta_1 variable\ interest\ social\ capital_{it} + \beta_2 control_{it} + e_{it}$$

Testing techniques in this study consist of weak instrument tests, overidentification tests, and endogeneity tests.

Social Capital

This study conceptualizes social capital through two distinct but interconnected dimensions: kinship based support networks representing bonding capital and community participation representing bridging capital. This operationalization recognizes both close personal connections and broader community engagement as essential components of social resources. Both dimensions prove critical for elderly resilience in post-disaster settings where formal support systems are often insufficient.

Kinship networks capture relational resources from immediate social circles through family support and neighbor or

friend support. Family support is measured by counting regularly contacted family members available for assistance. Neighbor or friend support is gauged through accessible non-kin connections providing aid. Support is further categorized into three critical types addressing different recovery needs: financial assistance involving monetary aid during crises, emotional support providing psychological reassurance, and grant-based aid offering non-repayable essential goods.

Community participation reflects active involvement in rebuilding social fabric after disasters. Activities were selected for analysis based on their high prevalence within the community, theoretical relevance to social capital concepts, and cultural significance in the local context. Six key activities were examined including community gatherings, disaster rebuilding efforts, volunteer initiatives, neighborhood patrols, religious activities, and social events. Religious activities showed the highest participation rates reflecting cultural embeddedness while patrols and volunteerism represented more specialized roles.

Methodologically, focusing on high-frequency activities ensured analytical precision while capturing behaviors with significant community impact. This approach allowed examination of activities most likely to influence social capital dynamics while maintaining research feasibility. The selection prioritized actions demonstrating substantial community involvement to effectively measure collective engagement aspects of social capital.

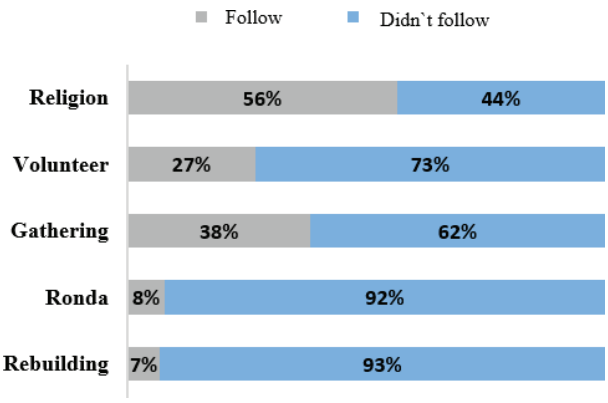

Figure 3. Percentage of Elderly Participating in Community Activities

Source: STARDATA, processed

DISCUSSION

The demographic profile of our sample reveals critical insights for understanding post-tsunami recovery dynamics. With 55% pre-elderly (45-59 years), 31% elderly (60-69 years), and 15% post-elderly (70+ years), this distribution reflects the heightened vulnerability of aging populations in disaster zones—a finding consistent with global evidence that older adults face disproportionate risks during catastrophes (Doocy et al., 2007; Gero et al., 2020). The near-equal gender distribution (50.04% female vs. 49.96% male) provides a robust foundation for analyzing gendered health outcomes, particularly relevant given our later findings of women's elevated physical and mental health vulnerabilities.

The substantial social capital indicators are noteworthy: respondents reported receiving support from an average of eight family members and seven neighbors/friends during disaster recovery. This aligns with Coleman's (1990) conceptualization of social capital as embedded in relational structures, where dense kinship networks

facilitate resource exchange and emotional scaffolding. The active community participation (47% engagement in activities like religious gatherings, rebuilding initiatives, and volunteer work) further exemplifies Putnam's (1993) bridging capital, creating horizontal associations that enhance collective efficacy. These figures empirically validate Adger et al.'s (2009) thesis that community-based social capital functions as organic disaster management infrastructure.

A particularly telling finding is that 79% of respondents remained in their original communities post-tsunami. This resistance to displacement—despite severe infrastructural damage—suggests socio-cultural anchoring through place-based social bonds. As Hikichi et al. (2020) observed, longevity in community residence strengthens trust networks and reciprocal norms (Fukuyama in Cao & Rammohan, 2016), creating what Aldrich and Meyer (2015) term "recovery capital." This immobility may reflect the "home advantage" effect where locally embedded social capital reduces recovery transaction costs by preserving existing support systems—a crucial buffer against the trauma of relocation (Frankenberg et al., 2012).

However, two paradoxes emerge: First, while community participation rates appear robust, our IV probit results later reveal its limited impact on PTSD mitigation—suggesting that broad civic engagement may not substitute for intimate, trust-based support in mental health recovery. Second, despite strong aggregate social capital metrics, significant health disparities persist across demographic subgroups, especially affecting older women and those with housing damage. This underscores the complex mediation of social capital's benefits by intersecting factors like gender roles, economic security, and physical environment—a nuance demanding policy attention.

These findings collectively reinforce the theoretical framework: the high-functioning kinship networks exemplify Coleman's structural social capital facilitating resource access; community participation reflects Putnam's civic engagement; and place attachment demonstrates the importance of trust norms. Yet the data also reveal limitations in how these capital forms translate to health outcomes, setting the stage for our causal analysis of physical and mental health determinants in the following section.

Table 3. Statistic descriptive variables

Variable	Percentage/Ratio/Average
average years of schooling	8 years
-Pre-elderly: 45-59 years	55%
-Elderly: 60-69 years	31%
-Post elderly: 70+ years	15%

Variable	Percentage/Ratio/Average
Dummy SAHS	32,52%
Dummy PTSD	38,87%
Dummy female	50,04%
Number of family supports	8 people
Number of support friends and neighbors	7 people
Number of relatives and friends	44 people
Number of family members	4 people
Dummy community participation	47,57%
Dummy property damage (house)	7,98%
Dummy life satisfaction	18,5
Dummy residence	79,30%
Household expenditure (mean log)	15,45

Source: Data processed, STARDATA

Table 4. Endogenenity Test

Dependent variable			
Dummy SAHS	Dummy ADL	Dummy PTSD	
Family support	chi2 (1) = 413,84***	chi2(1) = 28,04***	chi2(1) = 179,95***
Neighbour support	chi2 (1) = 71,15***	chi2(1) = 31,42***	chi2(1) = 178,34*
Community participation	chi2(1) = 38,34***	chi2(1)= 7,99***	chi2(1) = 16,18***

Significance level: *10 percent, ** 5 percent, * 1 percent**

The test indicated that there were endogeneity problems. Based on the results of endogeneity testing on social capital variables consisting of family support, support from friends and neighbours, and dummy participation, it can be found that these three variables are endogenous. An instrument variable is needed to overcome the bias in the estimation results.

Table 5. Weak Instrument Test

Endogen variable	Dependent variable		
	Dummy SAHS	Dummy ADL	Dummy PTSD
	Test using Wald Chi2 (1) or AR Chi2 (1)		
Family support	Wald chi2(1) = 161,20***	Wald chi2(1) = 22,95***	AR chi2(1) = 5,14***
Neighbour support	Wald chi2(1) = 21,60***	Wald chi2(1) = 25,30***	AR chi2(1) = 5,11***
Community participation	Wald chi2(1) = 11,62***	Wald chi2(1) = 7,56***	Wald chi2(1) = 5,39**

Significance level: *10 percent, ** 5 percent, *** 1 percent

The weak instrument test (Wald chi²) confirmed the significance of each instrument variable at the 1% and 5% levels, rejecting the null hypothesis. This demonstrates that the instruments (residence, number of networks, life satisfaction) are exogenous – they have no direct effect on the dependent variable (health outcomes), influencing it solely through their impact on the suspected endogenous variable (social capital). They are therefore valid for IV estimation.

Age (pre-elderly 45-59, elderly 60-70, post-elderly 70+), female gender, and spending were significantly *positively* associated with better self-assessed health (SAHS). Conversely, the number of family members, marital status, and house damage had *negative* effects on SAHS. Disaster severity, exemplified by house damage, adversely impacts health. Individuals aged 45 and above face significantly higher health risks than those under 45 (Sernau, 2019). Interestingly, higher education levels correlated with *lower* family/friend/neighbour support in the model. This likely reflects an indirect relationship: higher education often leads to better-paying jobs, reducing perceived need for support compared to lower-income individuals with less education. Social participation showed a *positive and significant* relationship with SAHS, indicating better self-assessed health for those active in community activities. However, this effect was primarily observed in the pre-elderly group (45-59 years). Older groups (60+) may be physically unable to participate, diminishing this benefit. While maintaining or increasing social capital is crucial for accelerating elderly disaster recovery, it is not the sole determinant. External factors, particularly the severity of property damage and geographic isolation, play critical roles as recovery indicators.

Table 6. Estimation Result of Social Capital to Post Traumatic Stress

Variable	IV Probit			Probit		
	Dependent variable			Dependent variable		
	Dummy PTSD			Dummy PTSD		
Family support	0,026**			-0,007***		
support	[0,026-]			[0,001]		
Variable indepedent						
60 – 69 years	-0,177***	-0,138***	-0,137***	-0,127***	-0,13***	0,064**
	[0,042]	[0,041]	[0,041]	[0,038]	[0,038]	[0,03]
45 – 59 years	-0,139***	-0,128***	-0,15**	-0,08**	-0,08***	-0,053***
	[0,024]	[0,023]	[0,025]	[0,022]	[0,022]	[0,016]
70+ years	0,03	0,064	0,074	-0,15**	-0,15**	-0,121**
	[0,079]	[0,082]	[0,084]	[0,07]	[0,07]	[0,056]
		-0,006**	-0,001	0,002	-0,00001	0,026***
House damage	-0,005**					
	[0,002]	[0,002]	[0,019]	[0,001]	[0,0017]	[0,0012]
					-	
Years of schooling	-0,273***	-0,284***	-0,245***	-0,13***	0,136***	-0,164***
	[0,04]	[0,044]	[0,034]	[0,03]	[0,03]	[0,024]
Log expenditure	-0,021**	-0,016***	-0,033***	-0,043***	0,044***	-0,056***
	[0,01]	[0,098]	[0,012]	[0,009]	[0,009]	[0,006]
Number of						
Household	-0,005**	-0,002	0,002	0,004	0,003	-0,008***
Member						
Dummy Female	[0,019]	-0,077***	- -0,06**	0,108*** -0,03**	-0,038**	0,069***
	`	[0,028]	[0,033]	[0,015]	[0,015]	[0,011]
Dummy Married	-0,108***	-0,082***	-0,14***	-0,03*	-0,032**	0,176***
[0,019]		[0,017]	[0,029]	[0,001]	[0,016]	[0,012]

Instrumentvariable						
Life satisfaction	Yes	Yes	Yes	-	-	-
Total Network	-	-	Yes	-	-	-
Observation	29.895	29.895	29.895	36.138	36.138	77.313
LR chi2(10)		178,34	177,20	152,61	122,65	3847,29

Significance: *10 percent, ** 5 percent, *** 1 percent
Source: Data processed, STARDATA

Strong social ties significantly protect elderly mental health after disasters. Higher support from family, neighbors, and friends, along with community participation, correlates with lower PTSD and depression levels (Sirven & Debrand, 2012; Gero et al., 2020), buffering against trauma symptoms like intrusive thoughts and social withdrawal. Elderly women face heightened vulnerability, consistently reporting higher rates of PTSD and depression than men (Zebhauser et al., 2014).

Social capital also directly enhances physical independence (ADL). Robust family and peer support improves the elderly's ability to perform daily activities post-disaster (Liang, 2020), mirroring findings in stroke recovery where family care reduces dependence (Hesamzadeh et al., 2017). Active community engagement further promotes ADL autonomy (Tomioka et al., 2017). Again, women are disproportionately affected, experiencing greater ADL decline due to chronic illness, cognitive strain, and care burdens (Liao et al., 2021; Scheel-Hincke et al., 2020).

Socioeconomic impacts, like housing loss, worsen outcomes. Damage to residences significantly hinders ADL performance and lowers quality of life, particularly for elderly women, widows, and those in temporary shelters (Ardalan, 2011). This findings are consistent with Cao & Rammohan (2016) and Suriastini (2023)

CONCLUSION

Social capital significantly improves physical health but shows no significant link between community participation and mental health (PTSD). Post-tsunami mental health relies more on support from family, neighbors, or friends. Being married and having larger households positively correlate with better health, suggesting partners/spouses promote health management. Women experienced significantly worse physical and mental health impacts than men.

or disaster recovery policy, prioritizing family and close social bonds is crucial for elderly well-being over institutional care. Promoting intergenerational support and community engagement (especially in preferred groups like religious organizations) is essential for their health, particularly after trauma. by severe physical and mental health than men.

Implications

Strengthen immediate support networks. Prioritize resources for family caregiver training and respite programs, while establishing neighborhood "buddy systems" to combat isolation among elders.

Target interventions for elderly women. Develop trauma counseling groups and accessible daily living (ADL) assistance, ensuring outreach specifically reaches widows and isolated women.

Activate community and family bonds. Collaborate with religious organizations for culturally resonant mental health activities and promote intergenerational living/care models to sustain kinship support.

Reallocate care infrastructure. Shift funding from institutional facilities toward home-based care, including mobile health teams and house modifications to keep elders in supportive home environments.

Further Research

Subsequent studies should broaden measurement to include comprehensive social capital metrics (e.g., trust, civic engagement) alongside objective health biomarkers. To address reciprocity, methods like ACEs (Sirven & Debrand, 2012) must be employed to model bidirectional links between social capital and health. Research should also explicitly integrate key contextual controls, notably property damage severity and specific living arrangements.

Finally, longitudinal or quasi-experimental designs are needed to establish clearer causal pathways in post-disaster recovery contexts.

ACKNOWLEDGEMENT

We gratefully acknowledge the invaluable guidance and supervision provided by Mrs. Evita Hanie Pangaribowo, PhD. We also extend our sincere thanks to Universitas Gadjah Mada for its essential support and facilities.

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