Perceived Stress and Self-Efficacy Among the Elderly in Tidal Flood-Prone Communities: A Socioepidemiological Perspective Study

Risna Endah Budiati[1*], Soeharyo Hadisaputro[2], Matheus Sakundarno Adi[3], Nur Aziza Dyah Wulandari[4]

[1]Institut Teknologi Kesehatan Cendekia Utama Kudus, Indonesia
[2-3]Universitas Diponegoro, Indonesia
[4]Central Java Provincial Health Office, Indonesia

*Corresponding Author: risna.eb@gmail.com

Abstract. The elderly population in a coastal area is exposed to dual ecological risks from tidal flooding and psychosocial stress. This study explored the relationship between perceived stress and self-efficacy among the elderly population in a community affected by tidal flooding in Demak Regency, Indonesia. A cross-sectional study was conducted involving 60 elderly participants (aged > 60) from three tidal flooding villages: Purwosari, Bedono, and Sriwulan. Data on perceived stress (Perceived Stress Scale-10) and self-efficacy (General Self-Efficacy Scale) were collected pre-post. Statistical analysis included paired t-tests and Pearson correlations. The mean perceived stress score decreased from 22.1 (SD ± 5.6) to 16.8 (SD ± 6.1), while self-efficacy increased from 21.5 (SD ± 6.3) to 26.4 (SD ± 5.8). Changes in stress levels were not statistically significant ($p = 0.067$), but self-efficacy showed a significant increase ($p < 0.01$). A moderate negative correlation ($r = -0.46$; $p < 0.01$) was found between post-intervention stress and self-efficacy. Although perceived stress in elderly decreased post-intervention without reaching statistical significance, the significant increase in self-efficacy suggests the potential of community-based interventions to enhance psychosocial resilience. Integrating these strategies in areas prone to tidal flooding could improve elderly well-being and disaster preparedness**.**
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Key words: elderly, perceived stress, self efficacy, tidal flood, psychosocial

INTRODUCTION

Elderly individuals residing in tidal flood areas face a of physical, environmental, and psychological vulnerabilities that significantly compromise their health, autonomy, and quality of life. In coastal regions such as Demak Regency, Central Java, recurrent tidal flooding has become an environmental stressor that disrupts daily routines, threatens livelihoods, and reduce the living conditions of already at risk populations. Elderly, in particular, experience greater risks due to age related physical limitations, chronic comorbidities, and diminished access to timely health and social services during and after flood events (Hisyam, Khotimah and Taurina, 2023)

Beside the immediate dangers of waterborne disease exposure and mobility hazards, prolonged tidal flood conditions generate chronic psychosocial stress. Frequent flooded house, displacement, property damage, and uncertainty about future flood events are sources of sustained psychological distress. The inability to control such recurring environmental adversity often leads to feelings of helplessness, anxiety, and in some cases, depressive symptoms. For elderly, these stressors are compounded by life course transitions such as reduced income, and declining physical function, all of which exacerbate vulnerability to mental health (Fitzgibbon *et al.*, 2020)

A critical determinant of psychological resilience among the elderly in disaster-prone settings is self-efficacy, a concept introduced by Albert Bandura, referring to an individual's belief in their capacity to manage and respond effectively to challenging situations. Self-efficacy influences how people perceive threats, regulate emotions, and engage in health-promoting behaviors. High self-efficacy in older adults has been linked to better coping strategies, proactive health behaviors (e.g., hygiene,

medication adherence), and increased social participation, even in the face of adversity (Bandura, 1978; Bunga and Kiling, 2015)

Conversely, perceived stress defined as the degree to which situations in one's life are appraised as stressful, tends to negatively correlate with self-efficacy. High perceived stress levels can diminish an individual's confidence and motivation to act constructively, often resulting in avoidance, passivity, or maladaptive behaviors. Among the elderly, high perceived stress has been associated with immune suppression, higher risk of cardiovascular events, poor sleep quality, and reduced engagement in preventive health behaviors (Cohen, Kamarck and Mermelstein, 1983; Park *et al.*, 2021)

In the context of tidal flood affected communities, the interplay between these two constructs perceived stress and self-efficacy is particularly crucial. Despite the increasing attention to environmental determinants of health in flood-prone areas, the psychosocial dimensions, especially among the elderly, remain understudied in Indonesia. Previous disaster resilience programs have predominantly targeted physical infrastructure and emergency response, often overlooking the psychological resilience and behavioral capacity of vulnerable subpopulations such as older adults (Stanke *et al.*, 2012)

This study aims to fill that gap by examining the relationship between perceived stress and self-efficacy among elderly residents living in tidal flood-affected areas of Demak Regency. By focusing on this specific demographic, the study contributes to a more holistic understanding of disaster resilience that integrates psychosocial well-being with public health preparedness. The findings are expected to inform community-based interventions that not only enhance adaptive capacity but also improve the overall mental and behavioral health outcomes for elderly populations in ecologically vulnerable settings.

METHODS

A quantitative cross-sectional study with a pre-post design was conducted to assess the relationship between perceived stress and self-efficacy among elderly residents living in tidal flood-prone areas of Demak Regency, Indonesia. The study was carried out in three coastal villages frequently affected by tidal flooding: Purwosari, Bedono, and Sriwulan. A total of 60 elderly participants aged 60 years and above were purposively selected from these villages. Inclusion criteria included: (1) being aged over 60 years, (2) residing in the study area for at least one year, and (3) being able to communicate verbally and provide informed consent. Individuals with severe cognitive impairment or serious physical illness were excluded.

Data Collection Instruments are Perceived Stress Scale-10 (PSS-10) and General Self-Efficacy Scale (GSES). Both instruments were administered before and after the intervention, which consisted of community-based health education sessions and psychosocial support activities according to elderly needs, conducted over a 4-week period.

Descriptive statistics were used to summarize demographic characteristics. The paired t-test was employed to compare pre- and post-intervention scores of perceived stress and self-efficacy. The Pearson correlation coefficient was used to analyze the relationship between post-intervention perceived stress and self-efficacy scores. A p-value of less than 0.05 was considered statistically significant. All analyses were performed using SPSS 21 version.

RESULTS AND DISCUSSION

Participant characteristics, the mean age was 67.3 years (range 61–80); 58% were female. Most had low educational attainment and relied on family support.

Table 1. Participant Characteristic (n = 60)

Variabel	Category	n	%
Age	Mean ± SD	67,3 ± –	–
	Range	61–80	–
Gender	Female	35	58,3%
	Male	25	41,7%
Education level	Non Formal education	21	35,0%
	Elementary school	27	45,0%
	Junior High School	9	15,0%
	Senior High School	3	5,0%
Social support	Rely on family support	48	80,0%
	Independent	12	20,0%

This report presents the results of a sub-analysis focusing on changes in perceived stress and self-efficacy among elderly individuals (aged ≥ 60) residing in tidal flood-prone villages in Sayung Subdistrict, Demak Regency. The analysis evaluates the impact of a community-based psychosocial intervention, comparing pre- and post-intervention scores within the full sample as well as between the intervention and control groups. Paired t-tests were used to analyze mean differences, and Pearson correlation was applied to examine the relationship between post-intervention stress and self-efficacy levels.

Table 2. Changes in Perceived Stress and Self-Efficacy (n = 60)

Variable	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	p-value
Perceived Stress	22.1 ± 5.6	16.8 ± 6.1	0.067
Self-Efficacy	21.5 ± 6.3	26.4 ± 5.8	< 0.01 **

Note: Paired t-test was used to compare pre- and post-intervention means.
Significance level: $p < 0.05$.

Table 3. Pearson Correlation Between Post-Intervention Perceived Stress and Self-Efficacy (n = 60)

Variables Compared	Correlation Coefficient (r)	p-value
Perceived Stress vs Self-Efficacy	-0.46	< 0.01 **

Note: Pearson correlation test.
Interpretation: Moderate negative correlation — higher self-efficacy is associated with lower perceived stress.

Table 4. Pre-Post Comparison by Group

Variable	Group	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	p-value
Perceived Stress	Intervention	23.4 ± 5.2	15.6 ± 5.9	0.021 *
Perceived Stress	Control	20.8 ± 5.8	18.0 ± 6.3	0.182
Self-Efficacy	Intervention	20.6 ± 6.1	28.1 ± 5.4	< 0.01 **
Self-Efficacy	Control	22.4 ± 6.4	24.6 ± 6.0	0.092

Note: Paired t-tests were conducted within each group.
* $p < 0.05$; ** $p < 0.01$ indicate statistical significance.

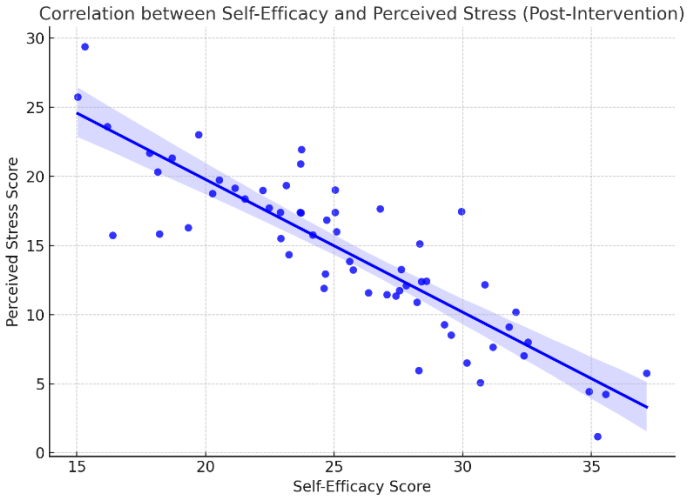

Figure 1. Correlation Between Self-Efficacy and Perceived Stress (Post Intervention)

This report presents the results of a sub-analysis focusing on changes in perceived stress and self-efficacy among elderly individuals (aged ≥ 60) residing in tidal flood-prone villages in Sayung Subdistrict, Demak Regency. The analysis evaluates the impact of a community-based psychosocial intervention, comparing pre- and post-intervention scores within the full sample as well as between the intervention and control groups. Paired t-tests were used to analyze mean differences, and Pearson correlation was applied to examine the relationship between post-intervention stress and self-efficacy levels.

Discussion findings suggest that while tidal flooding continues to pose a major threat, psychosocial interventions can improve elderly self-efficacy even if immediate stress reduction is limited. The moderate negative correlation affirms the protective role of self-efficacy in managing stress in older populations. Consistent with Bandura's theory, enhancing self-belief may serve as a buffer against environmental stressors. Several factors such as frailty, mobility issues, and prior trauma may explain the limited impact on stress scores. However, the community based approach enabled accessible delivery and promoted engagement. This model holds potential for broader replication in similar disaster-prone contexts (Ng and Jeffery, 2003; Bunga and Kiling, 2015).

The findings of this study provide valuable insight into the psychosocial dynamics affecting elderly populations living in tidal flood-prone areas. While the mean perceived stress score decreased from 22.1 (±5.6) to 16.8 (±6.1), the change did not reach statistical significance ($p = 0.067$). In contrast, self-efficacy scores showed a statistically significant improvement from 21.5 (±6.3) to 26.4 (±5.8) ($p < 0.01$), and a moderate negative correlation ($r = -0.46$; $p < 0.01$) was observed between post-intervention self-efficacy and perceived stress.

These findings suggest that while immediate reductions in stress may be limited, interventions targeting self-efficacy enhancement can give meaningful psychosocial benefits. In line with Bandura's Social Cognitive Theory, self-efficacy plays a central role in regulating emotional responses and motivating individuals to engage in adaptive health behaviors even under chronic stressors such as repeated tidal floods. The observed inverse correlation supports the hypothesis that self-efficacy serves as a protective buffer against perceived stress among older adults. The lack of statistically significant change in stress levels may be attributed to several factors intrinsic to elderly populations, physical frailty and chronic health conditions, such as osteoarthritis, diabetes, or hypertension, are prevalent in the study group and can produce subjective stress even after interventions. Limited mobility during rob

events, including difficulties in evacuation, navigating flooded paths, or accessing health facilities, may affected worst. Psychological trauma from past disaster experiences, particularly among elderly residents who have endured decades of rob exposure without structural resolution, may contribute to chronic stress states that require longer-term intervention to address (Schneiderman, Ironson and Siegel, 2005; Bunga and Kiling, 2015; Park *et al.*, 2021).

Despite these challenges, the significant improvement in self-efficacy following the intervention is encouraging. The structured training focused on stress management, problem-solving, and clean and healthy living behaviors (PHBS) appears effective in reinforcing internal coping resources, particularly confidence in one's ability to handle flood-related risks. Prior research has found similar effects of self-efficacy-based interventions among older adults in disaster and chronic disease settings (Cohen, 1988; Ab Rahman *et al.*, 2018; Mezquita-Hoyos and Patino-Munguia, 2019).

The community-based delivery mechanism also contributed to the success of the intervention. Utilizing culturally familiar platforms such as pengajian groups, posyandu lansia, and RT/RW structures facilitated engagement, reduced barriers to participation, and created a supportive learning environment. This localized, participatory approach aligns with principles of community resilience and has been recommended by WHO and other public health bodies for psychosocial programs in disaster-prone regions.

In terms of broader implications, this model holds replication potential in similar coastal areas of Indonesia and other low-lying countries facing sea-level rise and recurrent tidal flooding. The integration of psychosocial components such as self-efficacy building with environmental health promotion (e.g., PHBS practices) may provide a holistic, scalable framework for enhancing elderly well-being and disaster preparedness. However, several limitations should be acknowledged. The relatively short duration of the intervention (six weeks) may have limited the full psychosocial impact. Additionally, reliance on self-reported measures may introduce bias, particularly in stress appraisal among older adults. Future studies should consider:

1. Incorporating longer follow-up periods to assess the sustainability of psychosocial gains
2. Using qualitative methods to capture deeper insights into elderly experiences and coping strategies
3. Including objective stress biomarkers (e.g., cortisol levels) if feasible,
4. Testing the model in more diverse demographic and ecological settings.

Overall, the study underscores the critical role of psychosocial empowerment in strengthening community health resilience among the elderly in disaster-prone environments.

CONCLUSION

This study highlights the critical need to integrate psychosocial support into health intervention programs, especially those designed for elderly populations living in ecologically vulnerable areas such as tidal flood zones. The findings reveal that environmental stressors such as chronic inundation, displacement, and infrastructure instability can significantly impact the mental well-being and autonomy of older adults. These stressors often exacerbate pre-existing vulnerabilities related to aging, including declining physical health, reduced social networks, and limited access to timely health services.

By embedding psychosocial components, such as stress management, emotional support, and peer-based engagement, into public health initiatives, programs can more holistically address the needs of this at-risk demographic. Moreover, structured training programs that focus on strengthening self-efficacy have proven to be effective in enhancing the confidence and coping capacity of the elderly. When older individuals feel more competent and in control of their responses to adversity, they are better able to adapt, participate in community preparedness efforts, and recover from disaster events.

Ultimately, empowering the elderly through community-based psychosocial interventions not only improves their individual well-being but also contributes to the broader resilience of the community. Therefore, future disaster risk reduction and health promotion strategies should systematically include psychosocial resilience-building as a core element, particularly in areas frequently affected by climate-related hazards.

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