

Disaster Awareness, Management Practices and Community Resilience in Tanauan City: An Explanatory Sequential Analysis for Policy Review

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Abstract

This study examined disaster awareness, disaster management practices, and community resilience among residents of Tanauan City, Batangas in relation to typhoon-related hazards. Anchored on Community Resilience Theory, Community-Based Disaster Risk Management Theory, the Protective Action Decision Model, and the Sendai Framework for Disaster Risk Reduction, the study used a sequential explanatory mixed-method design. The quantitative phase employed a descriptive-correlational approach involving 399 residents selected from urban and rural barangays, while the qualitative phase used a phenomenological approach with 10 to 15 selected participants. Data were gathered through a researcher-developed questionnaire with an open-ended interview section, validated by experts and pilot-tested for reliability. Findings showed that respondents demonstrated high levels of disaster awareness, disaster management practices, and community resilience. Disaster awareness and disaster management practices had strong and significant positive relationships with community resilience, with disaster management practices exerting a stronger influence than awareness alone. No significant differences were found when respondents were grouped according to sex, age, educational attainment, and length of residency. Qualitative findings explained that lived disaster experiences, community cooperation, institutional support, and the role of the Bureau of Fire Protection strengthened preparedness, response, and resilience, although gaps remained in evacuation behavior, technical response skills, equipment, manpower, logistics, and coordination. The study concluded that resilience in Tanauan City is shaped by both knowledge and action, and recommended stronger inter-agency coordination, disaster education, drills, volunteer programs, response monitoring, hazard mapping, equipment audits, and community feedback systems. The study supports SDG 11, SDG 16, and SDG 17 by promoting safer communities, stronger institutions, and coordinated disaster response partnerships. Its sustainability impact lies in strengthening community preparedness, governance, public safety, institutional coordination, and socio-economic recovery in a typhoon-prone locality.

Keywords: Bureau of Fire Protection, Community Resilience, Disaster Awareness, Disaster Management Practices, Oplan PAGHALASA, Policy Enhancement, Sustainable Development Goals, Tanauan City, Typhoon-Related Hazards

1. Introduction

This study examined disaster awareness, disaster management practices, and community resilience among residents of Tanauan City, Batangas in relation to typhoon-related hazards. It situated the inquiry within global, national, and local disaster risk contexts and emphasized the role of the Bureau of Fire Protection (BFP), particularly Oplan PAGHALASA, in strengthening preparedness, response, coordination, and resilience. Using an explanatory sequential mixed-methods design, the study aimed to establish the relationships among demographic profile, disaster awareness, disaster management practices, and community resilience, and to use the findings as a basis for reviewing BFP disaster management policies and programs.

1.1 Disaster Awareness, Disaster Management Practices, and Community Resilience in Typhoon-Prone Tanauan City

Natural disasters continue to affect communities worldwide by causing casualties, property damage, service disruption, livelihood loss, and long-term social instability. In 2024, EM-DAT recorded 393 natural hazard-related disasters worldwide, resulting in 16,753 deaths, affecting 167.2 million people, and causing approximately US\$241.95 billion in economic losses. Asia remains highly exposed to severe tropical cyclone activity, while floods and storms continue to cause significant casualties and economic damage. These realities highlight the importance of community resilience, or the ability of communities to withstand, absorb, adapt to, and recover from hazards. (Centre for Research on the Epidemiology of Disasters [CRED], 2025; United Nations Office for Disaster Risk Reduction [UNDRR], 2017; World Meteorological Organization [WMO], 2025). In the Philippines, disaster preparedness is especially important because the country experiences an average of 20 tropical cyclones annually, with 8 to 9 making landfall and bringing floods, intense rainfall, and destructive winds. Republic Act No. 10121 shifted disaster management from a reactive relief model to a proactive

and comprehensive disaster risk reduction strategy involving national agencies, local governments, and communities (Congress of the Philippines, 2010; PAGASA, n.d.). Tanauan City, Batangas is a relevant local setting because of its recurring exposure to typhoons and hydrometeorological hazards. During Severe Tropical Storm Kristine in October 2024, PAGASA recorded 576.5 millimeters of storm-duration rainfall and 391.3 millimeters of rainfall within 24 hours at Ambulong, Tanauan City, showing the city's exposure to rainfall conditions linked to flooding, evacuation pressure, disrupted mobility, and increased emergency response needs (PAGASA, 2025). Within this hazard environment, the Bureau of Fire Protection, created under Republic Act No. 6975, supports public safety and emergency response. Its typhoon-related plan, Oplan PAGHALASA or "Paghahanda Laban sa Sakuna," includes evacuation center inspection, station mobilization, preparation of rescue equipment, coordination with disaster authorities, emergency transport support, and response readiness. These activities may influence residents' disaster awareness, disaster management practices, and community resilience through visible monitoring, evacuation assistance, information dissemination, rescue readiness, and inter-agency coordination. (Congress of the Philippines, 1990; Department of Social Welfare and Development [DSWD], 2017; Philippine Information Agency [PIA], 2024).

1.2 Related Literature on Disaster Awareness, Disaster Management Practices, and Community Resilience

The literature shows that disaster awareness and preparedness involve knowledge, capacities, and actions needed to anticipate, respond to, and recover from hazards. In the Philippine context, awareness is shaped by risk perception, past experience, media exposure, and perceived self-efficacy. Kurata et al. (2023) found that risk perception, personal experience, and media exposure influence perceived severity, vulnerability, social norms, behavioral control, adaptive action, and compliance in flood-prone communities. This supports the idea that localized risk perception and practical skills shape protective behavior. Recent studies also show that awareness alone does not always ensure preparedness. Avelino et al. (2024) found very high disaster readiness and awareness among riverine residents in Davao City, both of which were significantly related to adaptation and mitigation strategies. In contrast, Pelone and Arellano (2024) found strong household preparedness in Tagum City but noted gaps in institutional capacity building and weaknesses in some early warning communication tools. These findings suggest that awareness must be supported by practical training, effective communication, and institutional capability. Disaster management practices include planning, coordination, risk communication, and organized response. The United Nations Office for Disaster Risk Reduction defines disaster risk management as the systematic use of policies to prevent new risks, reduce existing vulnerabilities, and manage remaining threats. In the Philippines, Gundran et al. (2023) identified preparedness gaps among selected agencies in the National Capital Region, including overlapping structures, fragmented inter-agency engagement, and limited capacity-building programs. Meanwhile, Maraña et al. (2025) found that municipal DRRM initiatives in Quezon, Quezon improved community risk awareness, coping skills, and rescue capacities. These studies indicate that organized programs can improve community outcomes, although implementation gaps may affect effectiveness. The BFP's Oplan PAGHALASA shows how disaster policies are translated into operational practices. Government reports on BFP Region 5 described coordination with local DRRM offices, evacuation center inspection, personnel headcount, pre-disaster risk assessment participation, command center deployment, and inventory of rescue tools and equipment. These actions show that disaster management practices can be observed through readiness checks, mobilization, coordination, and community support during emergencies. Community resilience refers to the capacity of individuals and communities to absorb, adapt to, and recover from disasters while maintaining basic functions. Chong et al. (2025) showed that resilience outcomes in the Philippines are linked to active community-based governance rather than financial standing alone. Cvetković and Šišović (2024) found that age influences the social structure component of community resilience, while Solano et al. (2024) reported relationships among demographics, preparedness, and resiliency, although personal adaptability and flexibility were stronger predictors of disaster preparedness than demographics alone. Desalit et al. (2025) also found that community support, past disaster experience, and perceived susceptibility significantly predicted disaster response self-efficacy among adult residents in Tondo, Manila. Overall, the literature suggests that resilience develops through adaptive behavior, community support, governance, and practical confidence.

1.3 Global, National, and Local Context of Typhoon Risk and BFP Disaster Response

Globally, disaster risk reduction emphasizes understanding risk, strengthening governance, investing in preparedness, and improving response and recovery. Nationally, Republic Act No. 10121 provides the foundation for coordinated disaster risk reduction and management in the Philippines. Locally, Tanauan City's exposure to typhoon-related hazards makes it necessary to examine how residents' awareness and practices influence resilience. Policies and programs alone do not guarantee resilience because residents differ in preparedness actions, risk perception, disaster knowledge, and response behavior. (UNDRR, 2017; Congress of the Philippines, 2010). The BFP's legal and institutional role expanded through Republic Act No. 11589, or the Bureau of Fire Protection Modernization Act. This law strengthens the BFP's capacity to respond to natural and human-induced disasters, rescue operations, medical emergencies, and hazardous materials incidents. It also authorizes training for personnel and volunteers in disaster preparedness, rescue, and emergency medical response, while requiring coordination with LGUs and the national disaster risk reduction system. Recent government directions also show continuing BFP modernization. The DILG reported in 2023 that 1,484 cities and municipalities already had BFP fire stations, while station expansion and fire truck distribution were still underway. The DILG Strategic Plan

2023 to 2028 connects BFP modernization with improved fire prevention, suppression, investigation, emergency medical services, and rescue services. However, limited evidence exists on whether BFP policies and operational programs align with the actual needs of typhoon-prone communities.

1.4 Theoretical and Conceptual Foundations of Community Resilience and Disaster Risk Management

The study is anchored on Community Resilience Theory, Community-Based Disaster Risk Management Theory, and the Protective Action Decision Model. Community Resilience Theory by Norris et al. (2007) explains that resilience develops through community competence, social capital, information dissemination, and economic development. This supports the view that disaster awareness and management practices can strengthen residents' capacity to prepare for, respond to, and recover from typhoon-related hazards. The Community-Based Disaster Risk Management Theory emphasizes community participation in preparedness, mitigation, response, and recovery. Shaw (2012) explained that local communities serve as first responders during disasters; therefore, empowering residents through disaster education, participation, and collective action strengthens resilience. This theory supports the study because disaster awareness and disaster management practices depend on resident involvement in drills, planning, preparedness programs, and risk reduction activities. The Protective Action Decision Model explains how individuals decide on protective actions before and during disasters based on risk perception, warning messages, and environmental cues. Lindell and Perry (2011) stated that individuals with higher disaster awareness are more likely to engage in preparedness activities and protective behaviors that support resilience. PADM helps explain why some residents respond effectively during disasters while others may not act appropriately despite receiving similar information. Conceptually, the study follows an Independent Variable–Dependent Variable model anchored on the Sendai Framework for Disaster Risk Reduction (2015–2030). Disaster awareness, measured through risk perception, practical disaster-related skills, and institutional awareness, reflects Sendai Priority 1: Understanding Disaster Risk. Disaster management practices, measured through mitigation and preparedness, response, and recovery and coordination, align with Sendai Priorities 2 and 3: Strengthening Disaster Risk Governance and Investing in DRR. Community resilience, measured through robustness, resourcefulness, and rapidity, reflects Sendai Priority 4: Enhancing Disaster Preparedness for Effective Response and to “Build Back Better.” Demographic profile, including age, sex, highest educational attainment, and length of residency, serves as a moderating or co-variate variable.

1.5 Research Gaps and Rationale for BFP Policy Review in Tanauan City

Although disaster risk reduction policies and agency initiatives exist, local disaster outcomes still vary because residents differ in awareness, preparedness, and response behaviors. Some residents participate in drills, follow advisories, and develop practical skills, while others respond only when hazards occur. These differences show that resilience depends not only on policies but also on residents' knowledge, vulnerability perception, preparedness actions, and the translation of institutional programs into effective community practices. (UNDRR, 2017; Congress of the Philippines, 2010). There remains limited local empirical evidence in Tanauan City that directly connects demographic profile, disaster awareness, disaster management practices, and community resilience while using these findings as a basis for reviewing BFP policy. This study addresses that gap by first measuring residents' profiles, awareness, practices, and resilience, then testing the relationships among these variables. The qualitative phase will review BFP policies, particularly Oplan PAGHALASA and related disaster preparedness and response provisions, to determine whether policy directions match the needs shown by the data. The findings may guide stronger community information work, skill-based preparedness activities, clearer coordination procedures, better targeting of typhoon-vulnerable areas, and more responsive preparedness measures for Tanauan City (Congress of the Philippines, 2010; DSWD, 2017; PIA, 2024). The study is positioned to provide evidence for policy review, clarify how Oplan PAGHALASA and related BFP measures support Tanauan City's disaster program, and identify improvements in preparedness, response, coordination, and community resilience (Congress of the Philippines, 2010; PIA, 2024). It also contributes to Criminal Justice by situating disaster management within public safety and prevention, since disasters may create conditions associated with looting, stealing, and unrest.

1.6 Alignment with Relevant Sustainable Development Goals on Disaster Resilience, Public Safety, and Institutional Coordination

The study aligns with SDG 11 - Sustainable Cities and Communities because it focuses on strengthening resilience in Tanauan City, a typhoon-prone locality exposed to flooding, evacuation pressure, disrupted mobility, and emergency response needs. By assessing disaster awareness, disaster management practices, and community resilience, the study supports safer and more prepared communities. It also aligns with SDG 16 - Peace, Justice, and Strong Institutions because it reviews the role of the BFP and its disaster management policies in supporting public safety, emergency response, institutional coordination, and peace and order during calamities. The study further relates to SDG 17 - Partnerships for the Goals because disaster preparedness and response require coordination among the BFP, LGUs, local disaster authorities, schools, community leaders, residents, and emergency response agencies.

1.7 Importance of the Study to Community, Governance, Public Safety, and Socio-Economic Sustainability

This study contributes to community sustainability by identifying how residents' awareness, preparedness, response, recovery, and coordination practices may strengthen resilience in a typhoon-prone city. Its findings may help residents

recognize their strengths and weaknesses in disaster preparedness and become more active in protecting lives and property. The study also supports policy and governance sustainability by providing empirical evidence that may guide LGUs, community leaders, emergency response agencies, policy makers, and the BFP in improving disaster preparedness policies, resource allocation, coordination systems, emergency response strategies, training, and community-based resilience initiatives. It further contributes to educational, institutional, socio-economic, and public safety sustainability because stronger disaster awareness and management practices may support disaster education, reduce vulnerability, protect property, promote faster recovery, and help maintain peace and order during calamities.

2. Material and methods

2.1 Research Design

The study employed a mixed-method framework using a sequential explanatory design. The quantitative component was descriptive-correlational, as it aimed to describe the demographic profile of the respondents, determine their levels of disaster awareness, disaster management practices, and community resilience, and test the relationships among these variables. The qualitative component used a phenomenological approach to gather personal accounts and lived experiences of residents regarding disaster preparedness and response. Combining quantitative measurement with qualitative inquiry allowed the study to generate statistical findings and explain them through residents' actual experiences.

2.2 Locale of the Study

The study will be conducted in Tanauan City, Batangas, a city in the CALABARZON region that is exposed to natural hazards such as typhoons, floods, earthquakes, and volcanic eruptions. Its location near Taal Volcano and major fault lines, together with its urban and rural barangays, makes it an appropriate setting for examining disaster awareness, disaster management practices, and community resilience. The study will be conducted in the second quarter of 2026, before the onset of the rainy season, to assess residents' preparedness, awareness, and resilience before hazards become more critical.

2.3 Respondents of the Study

The respondents of the study will be residents of Tanauan City, Batangas who are 18 years old and above. They will come from selected urban and rural barangays to reflect differences in exposure, access to services, and disaster preparedness experiences. For the quantitative phase, the study will involve 399 respondents. For the qualitative phase, 10 to 15 participants will be selected from the survey respondents to provide detailed accounts of typhoon experiences, preparedness actions, response behavior, coordination, resilience, and views on local disaster-related policies and programs.

2.4 Sample and Sampling Procedure

The quantitative sample size of 399 respondents was determined using Slovin's formula, based on the estimated Tanauan City population of 273,366 and a 0.05 margin of error. The study will use stratified random sampling to ensure representation from both urban and rural barangays. The 48 barangays of Tanauan City will first be grouped according to their official classification, and selected barangays from each stratum will be included. Respondents will be proportionately distributed based on barangay population size, with larger barangays assigned more respondents and smaller barangays assigned fewer. Eligible respondents must be bona fide residents of the selected barangay, at least 18 years old, have lived in Tanauan City for at least one year, and be willing to participate. Temporary residents, those below 18 years old, and those unable to provide informed consent will be excluded. For the qualitative phase, purposive sampling will be used to select 10 to 15 participants from the quantitative respondents. Selection will consider their ability to provide rich descriptions of disaster experiences and will include variation in sex, age, barangay classification, disaster experience, and survey results. The survey findings will be compared with interview narratives to identify consistencies and possible gaps between perceived preparedness and actual disaster-related practices.

2.5 Research Instrument

The study used a researcher-developed questionnaire with an open-ended interview section to gather data on demographic profile, disaster awareness, disaster management practices, and community resilience. The questionnaire was written in simple language and presented in both English and Filipino to improve clarity and comprehension. It used a four-point Likert scale with the response options Very High Level, High Level, Low Level, and Very Low Level, corresponding to values of 4, 3, 2, and 1. This scale allowed respondents to express the degree of their awareness, practices, and views without a neutral midpoint. The questionnaire gathered demographic information such as age, gender, highest educational attainment, and length of residency. It measured disaster awareness in terms of risk perception, practical disaster-related skills, and institutional awareness. It also assessed disaster management practices in terms of mitigation and preparedness, response, and recovery and coordination. Community resilience was measured in terms of robustness, resourcefulness, and rapidity. The open-ended questions gathered deeper explanations about typhoon experiences, preparedness, response skills, warning systems, community cooperation, challenges in recovery, the role of the Bureau of Fire Protection, and possible improvements in BFP policies and programs. The instrument underwent validation by experts in disaster management, public safety, and research methodology to ensure that the items were clear, relevant, and aligned with the study objectives.

Revisions were made based on their comments, including improvements in wording, item sequencing, clarity, and bilingual consistency. Reliability was established through a pilot test involving 30 respondents from a barangay not included in the final sample. Cronbach's alpha results showed excellent reliability for disaster awareness, disaster management practices, and community resilience. Disaster awareness had reliability coefficients of 0.91 for risk perception, 0.92 for practical disaster-related skills, and 0.90 for institutional awareness. Disaster management practices had coefficients of 0.93 for mitigation and preparedness, 0.91 for response, and 0.90 for recovery and coordination. Community resilience had coefficients of 0.92 for robustness, 0.91 for resourcefulness, and 0.92 for rapidity. These results confirmed that the instrument was reliable and appropriate for the actual data gathering.

2.6 Data Gathering Procedure

Before data collection, the researcher will prepare the required documents, including the permission letter, validated questionnaire, interview guide, and informed consent form. Approval will be sought from the concerned school or institution, followed by coordination with the Office of the City Mayor and the barangay officials of the selected urban and rural barangays. This coordination will help ensure orderly access to respondents and appropriate schedules and locations for data gathering. After securing the necessary permissions, the researcher will conduct the quantitative phase by approaching selected respondents from the chosen barangays. The purpose of the study, voluntary nature of participation, and confidentiality of responses will be explained before administering the questionnaire. Only qualified respondents who provide consent will participate. The survey may be conducted face-to-face so that instructions can be clarified when needed, while ensuring that the researcher does not influence the respondents' answers. Completed questionnaires will be collected immediately and checked for missing responses. After the survey, the responses will be reviewed and encoded. The quantitative results will guide the selection of 10 to 15 participants for the qualitative phase. These participants will be invited for interviews, and the researcher will again explain the purpose, confidentiality procedures, and voluntary nature of participation. Permission to record will be requested when appropriate. Interviews will be conducted in a safe and convenient setting using the prepared interview guide. The study will use triangulation by comparing survey responses with interview narratives. This will help identify possible differences between reported preparedness and actual experiences, such as cases where respondents rate themselves as highly prepared but later describe delayed evacuation, lack of supplies, confusion about warnings, or dependence on external assistance. All questionnaires, interview notes, recordings, and transcripts will be organized and securely stored for analysis.

2.7 Data Analysis Techniques

Quantitative data will be processed through editing, coding, encoding, and tabulation. Completed questionnaires will be checked for completeness and consistency, and responses will be coded according to the four-point Likert scale. The encoded data will then be analyzed using appropriate statistical software. Frequency and percentage will be used to describe the demographic profile of the respondents in terms of age, sex, educational attainment, and length of residency. Weighted mean will be used to determine the levels of disaster awareness, disaster management practices, and community resilience based on their respective indicators. Pearson r correlation will be used to determine the significant relationships between disaster awareness and community resilience, and between disaster management practices and community resilience. Multiple regression analysis will be used to examine whether disaster awareness and disaster management practices, individually or together, significantly influence community resilience. A t-test or ANOVA will be used to determine whether there are significant differences in disaster awareness, disaster management practices, and community resilience when respondents are grouped according to demographic profile. Qualitative data from interviews will be transcribed, reviewed, coded, and analyzed through content or thematic analysis. Recurring ideas, patterns, and themes related to disaster awareness, disaster management practices, community resilience, and BFP policy enhancement will be identified. The qualitative findings will be used to explain and deepen the quantitative results, especially when survey responses differ from actual disaster experiences. The integrated findings will serve as the basis for developing policy recommendations for improving the disaster management programs of the Bureau of Fire Protection.

2.8 Ethical Considerations

The study will observe voluntary participation, informed consent, confidentiality, and responsible data handling. The purpose, procedures, and rights of participants will be explained before data collection, and names will be removed during coding. In the qualitative phase, explicit consent will be obtained before recording any interview. The researchers also acknowledge the responsible use of Artificial Intelligence tools only for language refinement, grammar checking, organization of ideas, and academic writing support. AI will not replace the researchers' own analysis, interpretation, and critical thinking. All AI-assisted information will be reviewed, verified, and validated to ensure accuracy, reliability, and academic integrity. Borrowed works will be properly cited, and the researchers will report and interpret the data honestly and responsibly.

3. Results and Discussion

3.1 Demographic Profile of the Respondents

3.1.1 Age and Sex

The respondents were mostly young to middle-aged adults. The largest age group was 18-25 years old with 120 respondents or 30.08 percent, followed by 26-35 years old with 110 respondents or 27.57 percent, 36-45 years old with 80 respondents or 20.05 percent, 46-55 years old with 60 respondents or 15.04 percent, and 56 years old and above with 29 respondents or 7.27 percent. In terms of sex, 210 respondents or 52.63 percent were male, while 189 or 47.37 percent were female. These findings indicate that the respondents were generally within age groups actively engaged in community life and capable of observing local disaster-related conditions. The slight predominance of male respondents did not create a major imbalance in representation. The findings are anchored on the Socio-Demographic Determinants Framework, which explains that individuals' perceptions, awareness, and responses are shaped by demographic characteristics such as age, sex, educational attainment, and length of residency. This is supported by UNDP (2021), World Bank (2022), and OECD (2023), which emphasize that demographic factors influence social awareness, judgment, and participation in community concerns.

3.1.2 Educational Attainment and Length of Residency

In terms of educational attainment, college graduates formed the largest group with 150 respondents or 37.59 percent, followed by college-level respondents with 90 or 22.56 percent, high school graduates with 60 or 15.04 percent, postgraduate degree holders with 39 or 9.77 percent, high school-level respondents with 35 or 8.77 percent, elementary graduates with 20 or 5.01 percent, and elementary-level respondents with 5 or 1.25 percent. For length of residency, most respondents had lived in Tanauan City for 21 years and above, with 144 respondents or 36.09 percent, followed by 11-20 years with 120 or 30.08 percent, 6-10 years with 80 or 20.05 percent, 1-5 years with 45 or 11.28 percent, and less than 1 year with 10 or 2.51 percent. The respondents' relatively high educational attainment and long-term residency suggest that their responses were grounded in both formal knowledge and lived community experience. Their familiarity with local conditions strengthened the contextual relevance of the data. Shah et al. (2021) found that individuals with higher educational attainment and longer community exposure tend to show a deeper understanding of risks, while Rahman and Khan (2023) identified age, educational background, and length of residency as important predictors of disaster awareness and response behavior.

3.2 Level of Disaster Awareness of the Residents

3.2.1 Risk Perception

The residents demonstrated a High Level of risk perception, with an overall weighted mean of 3.23 and standard deviation of 0.62. The highest-rated indicator was understanding the possible effects of typhoons in the community, with a weighted mean of 3.42, interpreted as Very High Level. This was followed by the belief that typhoon-related risks should be taken seriously, with a weighted mean of 3.30. The lowest-rated indicator was understanding the long-term effects of repeated disasters, with a weighted mean of 3.10, although still interpreted as High Level. This finding suggests that residents are aware of typhoon risks, especially their immediate effects, but may need deeper understanding of long-term disaster consequences. Their risk perception appears to be shaped by lived experiences with typhoons and flooding. The findings are supported by the Social Amplification of Risk Framework (SARF), as discussed in recent disaster studies by Kaspersen et al. (2021), which explains that disaster risk perception is shaped by direct experience, communication channels, social interaction, and institutional messaging.

3.2.2 Practical Disaster-Related Skills

The residents showed a High Level of practical disaster-related skills, with an overall weighted mean of 3.17 and standard deviation of 0.63. The highest-rated indicator was knowing how to provide basic first aid during disasters, with a weighted mean of 3.34, interpreted as Very High Level. Quick decision-making during emergencies followed with 3.21, while assisting vulnerable groups obtained 3.19. The lowest-rated indicator was knowing how to use basic emergency tools or equipment such as a fire extinguisher, with a weighted mean of 3.02. The results show that residents have basic emergency response capacity but still need further training in technical and equipment-based response skills. This reflects a gap between general awareness and full practical preparedness. The Protective Action Decision Model (Lindell & Perry, 2023) supports this finding by explaining that disaster-related behavior is influenced by risk perception, knowledge of protective actions, and awareness of official warnings and guidance.

3.2.3 Institutional Awareness

The residents had a High Level of institutional awareness, with an overall weighted mean of 3.21 and standard deviation of 0.61. Familiarity with warning signals and protocols obtained the highest weighted mean of 3.30, interpreted as Very High Level. Awareness of evacuation centers followed with 3.25, and awareness of BFP and emergency services obtained 3.22. The lowest-rated indicator was knowledge of barangay or LGU disaster programs, with a weighted mean of 3.12. This suggests that residents are familiar with general warning systems and emergency services but are less familiar with

specific disaster programs. Their engagement with formal disaster risk reduction initiatives may therefore remain more informational than participatory. Wang et al. (2022) found that disaster risk communication and community training enhance awareness and response capacity, while Ali and Rahman (2024) reported that local disaster preparedness activities and timely warning information are associated with higher disaster awareness and resilience.

3.3 Extent of Disaster Management Practices of the Residents

3.3.1 Mitigation and Preparedness

The residents demonstrated a High Level of mitigation and preparedness, with an overall weighted mean of 3.19 and standard deviation of 0.61. Preparing the family before disasters obtained the highest weighted mean of 3.30, interpreted as Very High Level, followed by preparing emergency kits at home with 3.28. Monitoring weather updates obtained 3.22, while the lowest-rated indicator was strengthening the house for disasters, with a weighted mean of 3.05. The results indicate that preparedness is strongest in household-level and family-centered actions but weaker in structural mitigation. This may reflect the influence of financial limitations or limited technical support. The findings are anchored on the Community Resilience Theory (Norris et al., 2007), which emphasizes adaptive capacities, social capital, and institutional support, and Protection Motivation Theory (Rogers & Maddux, 2024), which explains that people are more likely to perform familiar and immediately applicable protective actions than complex or resource-intensive measures.

3.3.2 Response

The residents showed a High Level of response practices, with an overall weighted mean of 3.26 and standard deviation of 0.62. Following safety instructions during disasters obtained the highest weighted mean of 3.45, interpreted as Very High Level, followed by reporting hazards to authorities with 3.36. Communicating with family during emergencies obtained 3.28, providing updates to neighbors obtained 3.22, evacuating when advised obtained 3.18, and helping others during disasters received the lowest mean of 3.05. The findings suggest that residents strongly comply with safety instructions and official directives, but direct assistance to others is less consistently practiced. This may be due to fear, self-preservation, or lack of formal training in emergency support roles. Putra et al. (2020) reported that households commonly prioritize immediate protective actions and adherence to official warnings, while Hassan and Lim (2024) found that coordination with local authorities is often stronger than community involvement in planning and recovery.

3.3.3 Recovery and Coordination

The residents demonstrated a High Level of recovery and coordination, with an overall weighted mean of 3.22 and standard deviation of 0.63. Coordination with the barangay or BFP obtained the highest weighted mean of 3.34, interpreted as Very High Level. Supporting rebuilding efforts followed with 3.27, sharing information after disasters obtained 3.18, and helping organize community meetings for disaster response improvement received the lowest mean of 3.09. The results show strong reliance on barangay officials and the BFP during recovery but weaker participation in community-led planning and evaluation. This suggests that recovery efforts are more institutionally coordinated than community-driven. Overall, the findings indicate that disaster management practices are generally high, particularly in household preparedness, safety compliance, and coordination with authorities, but long-term mitigation and participatory recovery initiatives still need strengthening.

3.4 Level of Community Resilience in Tanauan City

3.4.1 Robustness

The community demonstrated a High Level of robustness, with an overall weighted mean of 3.22 and standard deviation of 0.62. The highest-rated indicator was that community facilities are reinforced to resist disasters, with a weighted mean of 3.37, interpreted as Very High Level. This was followed by the community's ability to withstand disaster impacts, with 3.31. Basic services continuing during disasters obtained 3.24, physical preparedness obtained 3.11, and structures being prepared for disasters had the lowest mean of 3.08. The findings suggest that public facilities and community systems are perceived as relatively prepared, but household or private structural preparedness remains less consistent. This indicates uneven resilience, where community-level systems may be stronger than individual household capacities. Protection Motivation Theory (Rogers & Maddux, 2024) supports this interpretation by explaining that residents are more likely to engage in simple and familiar actions than in resource-intensive structural improvements.

3.4.2 Resourcefulness

The community showed a High Level of resourcefulness, with an overall weighted mean of 3.23 and standard deviation of 0.62. Residents helping each other obtained the highest weighted mean of 3.43, interpreted as Very High Level, followed by knowing where to get help with 3.38. Fair sharing of community resources during emergencies obtained 3.17, effective use of community resources obtained 3.12, and leaders managing resources well had the lowest mean of 3.04. This result highlights strong social capital and mutual assistance among residents, reflecting the value of bayanihan during emergencies. However, the lower score for resource management by leaders suggests possible challenges in formal coordination, planning, or resource distribution. The findings indicate that informal support systems are strong, but administrative resource management may require improvement.

3.4.3 Rapidity

The community demonstrated a High Level of rapidity, with an overall weighted mean of 3.21 and standard deviation of 0.63. The highest-rated indicator was that the community improves after disasters, with a weighted mean of 3.40, interpreted as Very High Level. Lessons learned from past disasters are applied promptly obtained 3.35, normal activities resume immediately obtained 3.18, the community recovers quickly obtained 3.09, and damaged areas are repaired quickly received the lowest mean of 3.02. The findings show that residents perceive the community as adaptive and capable of learning from past disasters, but physical repair and full recovery may take longer. This suggests that social recovery may be faster than infrastructure rehabilitation. Putra et al. (2020) and Hassan and Lim (2024) support this pattern by showing that immediate and authority-guided responses are often stronger than long-term recovery and structural resilience efforts.

3.5 Significant Relationships Among Disaster Awareness, Disaster Management Practices, and Community Resilience

3.5.1 Disaster Awareness and Community Resilience

The results showed strong and significant relationships between disaster awareness and all dimensions of community resilience. For robustness, risk perception obtained $r = 0.82$, practical disaster-related skills obtained $r = 0.85$, and institutional awareness obtained $r = 0.83$, all with $p = 0.000$. For resourcefulness, risk perception obtained $r = 0.84$, practical disaster-related skills obtained $r = 0.86$, and institutional awareness obtained $r = 0.83$, all significant. For rapidity, risk perception obtained $r = 0.81$, practical disaster-related skills obtained $r = 0.83$, and institutional awareness obtained $r = 0.82$, all with $p = 0.000$. These results indicate that residents with higher disaster awareness tend to demonstrate stronger resilience in terms of robustness, resourcefulness, and rapidity. Awareness provides the cognitive foundation for understanding risks, following protocols, and participating in recovery. The findings are anchored on the Knowledge-to-Action Framework in Disaster Risk Reduction (UNDRR-aligned applications, 2020), which explains that disaster knowledge becomes effective when applied in real situations, and the Risk-Resilience Interaction Model (Berkes & Ross, 2022), which emphasizes the interaction of risk awareness, adaptive behavior, and collective action.

3.5.2 Disaster Management Practices and Community Resilience

The results also showed strong and significant relationships between disaster management practices and all dimensions of community resilience. For robustness, mitigation and preparedness obtained $r = 0.85$, response obtained $r = 0.87$, and recovery and coordination obtained $r = 0.83$, all with $p = 0.000$. For resourcefulness, mitigation and preparedness obtained $r = 0.86$, response obtained $r = 0.88$, and recovery and coordination obtained $r = 0.84$. For rapidity, mitigation and preparedness obtained $r = 0.84$, response obtained $r = 0.86$, and recovery and coordination obtained $r = 0.83$, all significant. These findings show that disaster management practices are closely associated with resilience outcomes. Residents who prepare, respond, coordinate, and participate in recovery are more likely to contribute to a resilient community. Patel et al. (2020) found that higher disaster awareness improves preparedness and response capacity, while Nguyen and Tran (2024) reported that consistent disaster management practices improve recovery outcomes and adaptability. These findings support the view that awareness and practices are mutually reinforcing components of community resilience.

3.6 Influence of Disaster Awareness and Disaster Management Practices on Community Resilience

Disaster awareness and disaster management practices both had significant positive influence on community resilience. Disaster awareness obtained a regression coefficient of 0.41, beta value of 0.38, t-value of 8.92, and p-value of 0.000. Disaster management practices obtained a higher regression coefficient of 0.47, beta value of 0.45, t-value of 10.21, and p-value of 0.000. The model showed an R value of 0.75, R^2 of 0.56, adjusted R^2 of 0.55, and standard error of 0.32. The regression model was significant, with $F = 98.45$ and $p = 0.000$, indicating that 56 percent of the variation in community resilience was explained by disaster awareness and disaster management practices. These findings suggest that community resilience is shaped by both knowledge and action, but disaster management practices exert a stronger influence than awareness alone. Awareness helps residents understand risks and safety measures, while actual practices turn this knowledge into preparedness, response, and recovery behaviors. The findings are anchored on the Knowledge-to-Action Framework (UNDRR, 2020) and supported by the Disaster Resilience Pathway Model (Cutter et al., 2024), which explains that resilience develops through awareness, behavior, and adaptive capacity. Patel et al. (2020) and Nguyen and Tran (2024) similarly found that disaster awareness and management practices strengthen preparedness, response, recovery, and adaptability.

3.7 Differences in Awareness, Practices, and Resilience by Demographic Profile

The results showed no significant difference in disaster awareness, disaster management practices, and community resilience when respondents were grouped according to sex, age, educational attainment, and length of residency. For sex, disaster awareness obtained $p = 0.156$, disaster management practices obtained $p = 0.271$, and community resilience obtained $p = 0.178$. For age, all p-values were greater than 0.05, with disaster awareness at 0.115, disaster management practices at 0.093, and community resilience at 0.154. For educational attainment, disaster awareness obtained $p = 0.161$, disaster management practices obtained $p = 0.129$, and community resilience obtained $p = 0.173$. For length of residency,

disaster awareness obtained $p = 0.102$, disaster management practices obtained $p = 0.084$, and community resilience obtained $p = 0.137$. These findings suggest that disaster-related awareness, practices, and resilience are relatively uniform among residents and may be shaped more by shared community exposure than by demographic differences. This is anchored on the Social Learning Theory in Disaster Contexts (Bandura, 2022), which explains that individuals develop similar behaviors through observation and interaction, and the Collective Efficacy Theory (Sampson, 2023), which emphasizes shared beliefs, mutual trust, and cooperation. Shah et al. (2020) found that shared exposure to disasters results in similar preparedness actions across demographic groups, while Rahman and Lim (2024) reported that strong community networks and repeated disaster exposure reduce behavioral differences among residents.

3.8 Qualitative Explanation of the Statistical Relationships

The qualitative findings showed that lived experiences with typhoons and flooding strengthened residents' disaster awareness and risk perception. Participants explained that actual experiences with flooding, power interruption, evacuation, and storm impacts made them more conscious of warnings and more prepared during heavy rainfall. However, the findings also revealed an awareness–action gap, where residents knew what to do but sometimes delayed evacuation or failed to act immediately because of panic, concern for belongings, dependence on official announcements, lack of supplies, and financial limitations. Residents also acknowledged limited technical response skills, especially in using emergency tools, while emotional concern for family safety encouraged preparedness. Community cooperation remained a major strength, as residents helped neighbors, shared resources, and coordinated with barangay officials and the BFP, although delays, equipment shortages, logistical problems, and limited manpower affected response and recovery. These qualitative findings explain why disaster awareness and disaster management practices were statistically related to community resilience but also show why high awareness does not always result in consistent action. The findings are anchored on the Experiential Learning Theory in Disaster Contexts (Kolb, 2021), which explains that direct experience deepens understanding and decision-making, and Socio-Ecological Systems Theory (Folke et al., 2023), which explains that resilience is shaped by interactions among individual behavior, community relationships, and institutional systems. Patel and Singh (2020) found that panic, fear, and lack of preparedness hinder effective disaster action even when awareness is sufficient, while Béné and Wood (2024) found that social cohesion, mutual aid, and emotional support improve recovery outcomes despite limited institutional support and resources. These findings also align with Protection Motivation Theory (PMT), which suggests that high threat appraisal must be matched with coping capacity and resource-based empowerment.

3.9 Proposed Policy Enhancements for the Bureau of Fire Protection Disaster Management Programs

The proposed policy enhancements for the Bureau of Fire Protection disaster management programs in Tanauan City were developed from the lowest-rated indicators and identified gaps in disaster risk communication, preparedness participation, response efficiency, coordination, community involvement, and recovery monitoring. The proposed outputs include a standardized IEC dissemination system, mandatory and monitored disaster drills, real-time dispatch and response tracking, a unified incident command coordination protocol, formal accreditation and training of barangay-based disaster volunteers, and standardized post-disaster evaluation and reporting procedures. These proposed measures target 80 percent to 90 percent success indicators in areas such as information coverage, drill participation, response-time compliance, operational coordination, volunteer coverage, and post-disaster reporting. The findings indicate the need for BFP programs to move beyond information dissemination and toward stronger operational readiness, practical training, equipment support, coordination, and community participation. By reinforcing collaboration among the BFP, LGU, barangay officials, schools, and residents, the proposed policy enhancements may strengthen preparedness, response capability, recovery monitoring, and community resilience. Overall, these measures are intended to transform identified gaps into actionable and measurable policy outputs, contributing to a more efficient and sustainable local disaster management framework.

4. Conclusion & Recommendations

The study concluded that the respondents, who were mostly young adults, male, college graduates, and long-term residents of Tanauan City, demonstrated high levels of disaster awareness, disaster management practices, and community resilience. Their awareness of risks, preparedness measures, and safety practices was reflected in proactive behaviors during emergencies and in the community's ability to withstand disaster impacts, use available resources, and recover from adverse events. The findings showed that disaster awareness and disaster management practices had significant positive relationships with community resilience, with actual disaster management practices having a stronger influence than awareness alone. No significant differences were found when respondents were grouped according to sex, age, educational attainment, and length of residency, indicating consistency across demographic groups. The qualitative findings further supported the quantitative results by showing that lived experiences, community cooperation, institutional support, and the role of the Bureau of Fire Protection contribute to disaster preparedness, response, and resilience.

The study recommends strengthening disaster preparedness and response through coordinated actions among the LGU, barangay officials, BFP, DRRM offices, schools, and community stakeholders. These actions include establishing a youth-led community disaster volunteer program, developing accessible disaster education systems such as SMS alerts, short

video modules, or QR-based IEC materials, institutionalizing quarterly multi-agency simulation exercises, creating a barangay disaster scorecard system, using hazard mapping and community risk profiling for data-driven planning, improving rapid response through dispatch monitoring and equipment optimization, customizing programs for vulnerable groups, conducting regular audits of equipment, manpower, and logistics, and establishing a community feedback and reporting system to improve disaster response performance.

The study was limited by the practical barriers identified in the findings, particularly limited resources, response delays, equipment and manpower concerns, and coordination challenges that may reduce the effectiveness of disaster management efforts. These limitations suggest that although residents showed high awareness, preparedness, and resilience, the full effectiveness of disaster response and recovery still depends on sustained institutional support, adequate resources, timely response systems, and stronger coordination among disaster management stakeholders.

Compliance with ethical standards

The study observed voluntary participation, informed consent, confidentiality, and responsible data handling. The purpose, procedures, and rights of the participants were explained before data collection, and names were removed during coding. The researchers also ensured the responsible use of Artificial Intelligence tools only for language refinement, grammar checking, organization of ideas, and academic writing support, without replacing the researchers' own analysis, interpretation, and critical thinking. All AI-assisted content was reviewed, verified, and validated, and the researchers reported and interpreted the data honestly and responsibly.

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