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Community Understanding of Household Emergency Medicines for Flood Preparedness in Lekobalo Urban Village, Gorontalo City, Indonesia

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ABSTRACT

Flood events in Gorontalo City repeatedly generate acute health risks and disrupt access to routine healthcare, making household-level preparedness particularly the availability and appropriate use of emergency medicines an essential component of disaster risk reduction. This study assessed community understanding of household emergency medicines for flood preparedness in Lekobalo Urban Village, Gorontalo City, Indonesia, using a cross-sectional design. A total of 150 residents were recruited by purposive sampling and completed a 24-item questionnaire covering four domains: knowledge of emergency medicines, medication procurement behaviour, medication use, and information sources; the instrument demonstrated excellent internal consistency (Cronbach's alpha = 0.958). Overall, community understanding was predominantly moderate (55.8%), followed by low (27.4%) and high (16.8%) categories, indicating that preparedness knowledge and practical medication readiness remain suboptimal in a substantial proportion of households. Descriptive comparisons suggested variability across sociodemographic characteristics, implying that targeted health education and community-based pharmaceutical counselling may be required to strengthen household readiness before, during, and after flood events. These findings support the integration of structured risk communication on essential emergency medicines into local disaster preparedness programmes, aligned with primary healthcare and community pharmacy engagement.

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ABSTRAK

Kejadian banjir di Kota Gorontalo berulang kali memicu risiko kesehatan akut serta mengganggu akses masyarakat terhadap layanan kesehatan rutin, sehingga kesiapsiagaan pada tingkat rumah tangga terutama ketersediaan dan penggunaan obat darurat yang tepat menjadi elemen penting dalam pengurangan risiko bencana. Penelitian ini bertujuan menilai pemahaman masyarakat mengenai obat darurat rumah tangga untuk kesiapsiagaan banjir di Kelurahan Lekobalo, Kota Gorontalo, menggunakan desain potong lintang. Sebanyak 150 responden direkrut melalui purposive sampling dan mengisi kuesioner 24 butir yang mencakup empat domain, yaitu pengetahuan tentang obat darurat, perilaku pengadaan obat, penggunaan obat, dan sumber informasi; instrumen menunjukkan konsistensi internal yang sangat baik (Cronbach's alpha = 0,958). Hasil menunjukkan pemahaman masyarakat didominasi kategori sedang (55,8%), diikuti kategori rendah (27,4%) dan tinggi (16,8%), yang mengindikasikan bahwa pengetahuan dan kesiapan praktis terkait obat darurat masih belum optimal pada sebagian rumah tangga. Variasi deskriptif berdasarkan karakteristik sosiodemografi mengisyaratkan perlunya edukasi kesehatan yang lebih terarah dan penguatan konseling kefarmasian berbasis komunitas untuk meningkatkan kesiapsiagaan sebelum, saat, dan setelah banjir. Temuan ini mendukung integrasi komunikasi risiko yang terstruktur mengenai obat-obat esensial darurat ke dalam program kesiapsiagaan bencana lokal melalui sinergi layanan kesehatan primer dan peran tenaga kefarmasian.

Kata Kunci: Banjir; kesiapsiagaan bencana; obat darurat; literasi obat; Gorontalo

1. Introduction

A disaster can be conceptualised as an event that generates substantial loss, damage, and suffering, affecting human populations, ecosystems, and the built environment through natural processes, anthropogenic drivers, or the interaction between both. In Indonesia, flooding remains one of the most recurrent hazards and continues to impose a persistent public-health burden, not only through direct morbidity and mortality, but also through disruption of routine health services, impaired access to essential resources, and the amplification of vulnerability among households living in high-risk areas [1]. The magnitude of disaster impacts is also evident at the global level; disaster surveillance reports have documented considerable mortality and extensive economic losses within a single year, while Indonesia consistently appears among countries experiencing a high frequency of disaster events [1]. At the national scale, flood incidents repeatedly dominate the disaster profile, and longitudinal disaster information systems further indicate that floods constitute one of the most frequently recorded hazards across the last decade, reinforcing the need for preparedness interventions that are operational, community-oriented, and context-specific [1].

Within Gorontalo Province, flooding is similarly recognised as a recurrent phenomenon with tangible implications for casualties, property damage, and disruption of daily living. Tolodo *et al.* described that flood intensity in Gorontalo tends to escalate during the rainy season and recurs annually, implying a stable hazard pattern that should be anticipated rather than treated as episodic or unpredictable [2]. In Gorontalo City, Lekobalo Urban Village is frequently identified as one of the localities affected by severe flood impacts, suggesting that community-level preparedness and risk reduction efforts require deliberate strengthening, particularly in settings where exposure and susceptibility converge [2].

Disaster risk reduction increasingly emphasises shared responsibility, where community participation is pivotal for recognising hazards, enhancing anticipatory capacity, and implementing responsive actions that minimise adverse outcomes. In

parallel, health-sector preparedness is not only a matter of service continuity but also of ensuring that households possess practical readiness to manage common flood-related health problems when healthcare access becomes constrained. In this regard, pharmaceutical preparedness defined pragmatically as the availability, appropriate selection, and rational use of essential medicines during emergencies constitutes a critical yet often under-recognised dimension of resilience. The Ministry of Health has issued technical guidance for health crisis management during disasters, including coordination mechanisms and recommended medicine needs according to disaster typology, indicating that medicine availability is integral to both emergency response and broader disaster management systems [3],[4]. However, the effectiveness of such guidance at the community level is ultimately mediated by public understanding, household behaviours, and information pathways, because medicine availability without adequate knowledge may lead to inappropriate use, delayed care-seeking, or preventable complications.

Flood contexts provide a particularly compelling rationale for assessing household-level medicine preparedness, because floods are commonly associated with increased risks of waterborne and vector-related diseases, skin infections, gastrointestinal disorders, and exacerbations of chronic illness. These risks can intensify when sanitation is compromised, clean water becomes limited, and mobility is restricted. Consequently, strengthening community understanding regarding what constitutes "household emergency medicines," how they should be obtained and stored, and how they should be used safely during flood events can function as a preventive strategy that supports early self-care while reducing the probability of severe health crises [5]. Preparedness in disaster literature is generally defined as a set of organised activities aimed at anticipating disasters through appropriate and effective measures; complementary perspectives also underline preparedness as a proactive effort to reduce casualties through planning, collective engagement, and strengthened risk communication at the community level [6],[7]. These conceptualisations converge on the premise that preparedness is not merely procedural but behavioural and practical, requiring both knowledge and actionable readiness within households.

On this basis, the present study was conducted to assess community understanding of household emergency medicines for flood preparedness in Lekobalo Urban Village, Gorontalo City, Indonesia. By mapping the level of understanding within the community and situating it within the logic of disaster-health preparedness, the findings are expected to provide an empirical basis for targeted health education, structured risk communication, and community-based pharmaceutical counselling strategies that can be integrated into local flood preparedness programmes.

2. Methods

Study design and setting

This study applied a quantitative descriptive approach using a cross-sectional survey to examine community understanding of household emergency medicines for flood preparedness in Lekobalo Urban Village, Gorontalo City, Indonesia, a locality that experiences recurrent flood exposure as described in the regional context [2]. The conceptual orientation of the study was aligned with disaster-preparedness and risk-reduction perspectives that emphasise organised anticipatory actions and community readiness as integral elements of disaster management [6],[7].

Population, sample, and sampling technique

The study population comprised adult residents of flood-prone neighbourhoods in Lekobalo Urban Village. A total of 150 respondents were included in the final analysis. Respondents were recruited using purposive sampling to ensure inclusion of community members with relevant lived exposure and practical experience related to flood events [2]. Eligibility criteria included: (1) residents aged ≥18 years, (2) residing in the study area during the data-collection period, (3) willing to participate with informed consent, and (4) able to complete the questionnaire independently. Incomplete responses were excluded from analysis.

Instrument development and measurement domains

Data were collected using a structured questionnaire designed to assess "understanding" in relation to household emergency medicines for flood preparedness, operationalised across four domains: knowledge of emergency medicines, medicine procurement behaviour, medicine use, and information sources. The selection of domains was informed by the practical logic of pharmaceutical preparedness during disasters, where households need to recognise essential medicines, procure them appropriately, use them rationally, and access trustworthy guidance dimensions consistent with health-crisis management expectations in disaster contexts [3], [4] and the broader preparedness orientation emphasised in disaster literature [6], [7].

Validity and reliability testing

A pilot test was conducted prior to full data collection to evaluate item performance. Item validity was assessed through correlation-based item analysis using a pre-specified r-table threshold; items meeting the validity criterion were retained for the final instrument. Reliability of the retained items was then evaluated using Cronbach's alpha, and the instrument demonstrated excellent internal consistency (Cronbach's alpha = 0.958).

Scoring and categorisation of understanding level

Each respondent's total understanding score was computed by summing the item scores across all retained questions. The overall level of understanding was then classified into low, moderate, and high categories using the cut-off criteria applied in this study to enable interpretable distribution mapping of preparedness-related understanding within the community.

Data collection procedure

Questionnaires were administered to eligible respondents following explanation of the study purpose and instructions for completion. Participation was voluntary, and anonymity/confidentiality principles were maintained throughout data handling.

Data analysis

Data were processed using **SPSS**. Univariate analysis was conducted to describe respondent characteristics and the distribution of understanding categories using frequencies and percentages. Bivariate exploration was performed using cross-tabulation to observe distributional patterns of understanding across sociodemographic characteristics. Where the analysis plan required inferential interpretation, association testing using the chi-square approach was applied to examine relationships between categorical variables.

Ethical considerations

The study has been reviewed and approved by the Ethics Committee of the Faculty of Sport and Health, State University of Gorontalo, under protocol number 092/8.1.3.67/KP/KEPK/2025, dated 6 May 2025. The research adheres to ethical

principles of voluntary participation, informed consent, confidentiality, and privacy protection.

3. Results and Discussion

Instrument Quality

To ensure that the subsequent findings on community understanding are methodologically defensible, the questionnaire was first subjected to instrument quality assessment. This stage is essential because conclusions derived from survey data depend on whether the instrument demonstrates adequate validity (items truly measure the intended construct) and reliability (items produce consistent measurements). Therefore, a pilot evaluation was conducted to verify item validity using item–total correlation analysis and to confirm internal consistency using Cronbach's alpha prior to analysing respondent distributions and cross-tabulation patterns.

Table 1. Item Validity Test of the Questionnaire (Pilot Test)

Parameter	Value
Initial number of items	16
Pilot respondents (n)	20
Validity method	Item–total correlation (Pearson)
r-table (df = 18, α = 0.05)	0.444
Decision rule	Item is valid if *r*calculated > *r*table
Result	All 16 items valid

Data source: SPSS output, 2025.

Based on Table 1, the instrument used to measure community understanding of mitigation medicines demonstrated satisfactory item validity. All 16 items showed a calculated r value greater than the r-table value (0.444), indicating that each question was statistically valid for measuring the intended construct. The interpretation is therefore unambiguous: because the conclusion is "all items are valid," the correct relationship is r_calculated > r_table, and any statement implying r_calculated < r_table must be corrected as a typographical/logical inconsistency.

Table 2. Reliability Test of the Questionnaire

Reliability indicator	Value
Number of valid items	16
Reliability statistic	Cronbach's alpha
Cronbach's alpha (α)	0.958
Interpretation	Excellent internal consistency

Data source: Processed SPSS data, 2025.

As presented in **Table 2**, the reliability analysis produced a Cronbach's alpha of 0.958, which indicates excellent internal consistency of the 16-item questionnaire. This finding supports the stability and coherence of the instrument, suggesting that the retained items measure a common underlying construct related to household understanding of mitigation medicines. Accordingly, the questionnaire is appropriate for use in the main analysis of respondent characteristics and the distribution of understanding levels in the study population.

Respondent Characteristics

To contextualise the interpretation of community understanding of mitigation medicines, respondent sociodemographic characteristics were first described. This step is analytically important because differences in gender roles, age-related cognitive

development, educational attainment, and occupational exposure to information networks may shape how individuals access, process, and apply health-related knowledge in disaster settings. Accordingly, the respondent profile is presented to provide a demographic foundation for subsequent cross-tabulation and interpretive discussion.

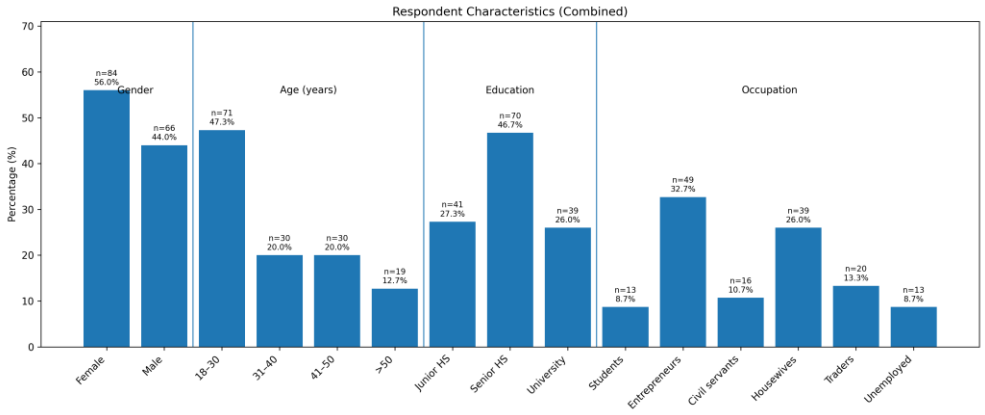

Figure 1. Respondent Characteristics by Gender, Age, Education, and Occupation

Figure 1 presents a consolidated distribution of respondent characteristics across four sociodemographic dimensions. In terms of gender, the sample was predominantly female, with 84 respondents (56%) compared with 66 males (44%). In disaster-prone communities, women often hold central responsibilities in household management and family health decision-making, which may influence engagement with preparedness information and medicine-related practices; conceptually, women's roles encompass both domestic and public responsibilities, positioning them as active participants in community health and resilience activities [8].

Regarding age, nearly half of respondents were within the 18–30 years category (n = 71; 47.3%), followed by 31–40 years (n = 30; 20.0%), 41–50 years (n = 30; 20.0%), and >50 years (n = 19; 12.7%). Age is commonly recognised as a factor shaping cognitive development, information comprehension, and health-related judgement; as individuals mature, their capacity to integrate information and apply structured reasoning may improve, thereby influencing how preparedness messages are interpreted and enacted [9]. The dominance of younger respondents is also relevant because this group may demonstrate distinct information-seeking behaviours, particularly via technology-mediated channels.

In relation to educational attainment, senior high school represented the most common highest education level (n = 70; 46.7%), followed by junior high school (n = 41; 27.3%) and university level (n = 39; 26.0%). Educational background is frequently associated with differences in information literacy and interpretive capacity, which may shape preparedness-related knowledge and medicine-related decision-making, thereby providing an important lens for later analysis of understanding levels [12], [13].

Finally, occupational distribution indicated that entrepreneurs constituted the largest group (n = 49; 32.7%), followed by housewives (n = 39; 26.0%), traders (n = 20; 13.3%), civil servants (n = 16; 10.7%), students (n = 13; 8.7%), and unemployed respondents (n = 13; 8.7%). Occupational status may reflect differential exposure to social networks and structured information channels that shape access to health communication and preparedness knowledge; household managers such as housewives

may also engage more frequently in neighbourhood interaction, potentially facilitating informal preparedness-related information exchange [10]. Nonetheless, these explanations are presented as contextual interpretations, while empirical patterns of association are addressed more directly in the subsequent cross-tabulation section.

Understanding Level

To interpret the practical meaning of community preparedness in relation to household emergency medicines, the overall understanding level was first summarised at the population level. This descriptive profile is essential because it indicates whether the community's medicine-related preparedness is already adequate or whether it remains concentrated at an intermediate stage that requires structured reinforcement through risk communication and pharmaceutical counselling.

Table 3. Overall Level of Community Understanding of Mitigation Medicines

Understanding level	n	%
Low	43	28.7
Moderate	85	56.6
High	22	14.7
Total	**150**	**100.0**

Source: Processed SPSS data, 2025.

As shown in **Table 3**, respondents were classified into three categories of understanding (low, moderate, and high) based on the total scores derived from the 16 validated questionnaire items. The results demonstrate that the understanding level was predominantly moderate, with 85 respondents (56.6%) classified in this category. In addition, 43 respondents (28.7%) were categorised as having low understanding, while only 22 respondents (14.7%) reached the high understanding category.

Substantively, the predominance of moderate understanding suggests that a substantial proportion of respondents already possess an initial conceptual awareness of the relevance of mitigation medicines in flood situations, yet their knowledge may not be sufficiently comprehensive or consistently translated into correct practice. In applied terms, moderate understanding typically reflects partial competence: respondents may recognise basic medicine types and general purposes, but still show gaps in technical and safety-critical components such as dosage accuracy, timing of administration, recognition of adverse effects, expiry-date awareness, and appropriate storage conditions. This interpretation is consistent with the view that educational exposure and cognitive processing skills shape how individuals comprehend and apply health information in practice, including medicine-related instructions and risk awareness [12],[13].

Conversely, the high understanding subgroup indicates the presence of households with more robust preparedness capacity, reflected in stronger recognition of emergency medicine needs and better adherence to safety principles. Overall, this distribution implies that the community demonstrates meaningful foundational readiness, but a considerable segment remains vulnerable to inappropriate medicine use during floods unless preparedness education is strengthened, particularly in domains requiring technical precision and risk awareness [12],[13].

Cross-tabulation Findings

To explore how the overall understanding level of mitigation medicines varies across sociodemographic subgroups, cross-tabulation analysis was conducted. This step is important because the observed distribution of low, moderate, and high understanding may not be uniform across gender, age strata, educational attainment,

and occupational status, and such patterns can provide an empirical basis for interpreting which groups may require more targeted preparedness communication and household-level pharmaceutical counselling.

Table 4. Cross-tabulation of Respondent Characteristics with Level of Understanding of Mitigation Medicines

Respondent characteristics	Category	Low n (%)	Moderate n (%)	High n (%)	Total n (%)
Gender	Male	20 (13.3)	35 (23.3)	11 (7.3)	66 (44.0)
	Female	23 (15.3)	50 (33.3)	11 (7.3)	84 (56.0)
	Total	43 (28.7)	85 (56.6)	22 (14.7)	150 (100.0)
Age group (years)	18–30	17 (11.3)	39 (26.0)	15 (10.0)	71 (47.3)
	31–40	10 (6.7)	18 (12.0)	2 (1.3)	30 (20.0)
	41–50	9 (6.0)	17 (11.3)	4 (2.7)	30 (20.0)
	>50	7 (4.7)	11 (7.3)	1 (0.7)	19 (12.7)
	Total	43 (28.7)	85 (56.6)	22 (14.7)	150 (100.0)
Highest education level	Junior high school	27 (18.0)	14 (9.3)	0 (0.0)	41 (27.3)
	Senior high school	14 (9.3)	54 (36.0)	2 (1.3)	70 (46.7)
	University	2 (1.3)	17 (11.3)	20 (13.3)	39 (26.0)
	Total	43 (28.7)	85 (56.6)	22 (14.7)	150 (100.0)
Occupation status	Not working	11 (7.3)	2 (1.3)	0 (0.0)	13 (8.7)
	Working	32 (21.3)	83 (55.3)	22 (14.7)	137 (91.3)
	Total	43 (28.7)	85 (56.6)	22 (14.7)	150 (100.0)

Table 4 summarises the distribution of understanding categories (low–moderate–high) across respondent characteristics. Overall, the moderate understanding category remained dominant in the total sample (56.6%), followed by low (28.7%) and high (14.7%), indicating that many respondents possess foundational awareness but may not yet demonstrate complete and consistent readiness in medicine-related preparedness practices.

From the gender stratification, females showed a slightly higher representation in the moderate category than males. This pattern may plausibly reflect gendered roles in household health management and community engagement, where women in disaster-prone settings are often more actively involved in family health decision-making and community-based activities, potentially increasing exposure to preparedness-related information [10]. This interpretation is consistent with perspectives that gender influences perception, responsiveness, and participation in community information networks.

Across age categories, the 18–30 year group contributed the largest share of respondents in the moderate category. This distribution is aligned with the notion that younger individuals tend to access information more frequently through digital platforms, which may facilitate exposure to disaster preparedness messages, including medicine-related guidance [11]. Conversely, the older age groups especially those >50 years were less represented within the moderate category and showed comparatively

smaller proportions in the high category, a finding that may reflect differences in information access, learning modalities, and reliance on experience-based knowledge rather than continuous informational updating.

Educational attainment demonstrated the clearest gradient in relation to understanding levels. University-educated respondents showed a higher proportional representation in the high understanding category compared with respondents with junior high school or senior high school education. This pattern coheres with cognitive-domain perspectives suggesting that formal education strengthens analytical and critical thinking, which supports more accurate interpretation of health information, including the comprehension of questionnaires, medicine labels, and usage instructions [12]. Moreover, education is frequently associated with broader literacy and data interpretation skills, which are essential when understanding medicine-related technicalities such as indications, dosage, timing, and safety considerations, thereby facilitating more confident decision-making under emergency conditions [13].

In relation to occupation, respondents who were employed dominated the moderate understanding category, whereas unemployed respondents represented only a small proportion in the moderate category. Occupational engagement may increase exposure to organisational routines and social networks that facilitate information exchange and health literacy development. This is consistent with the view that employment can reflect wider connectivity to information channels and participation in social environments where health communication and preparedness knowledge may circulate [14]. Furthermore, work-related responsibilities may shape decision-making styles toward greater efficiency and risk awareness, which could indirectly support preparedness behaviours, including maintaining and appropriately using emergency medicines [15].

Discussion and Implications

The findings of this study demonstrate that community understanding of household emergency medicines for flood preparedness in Lekobalo Urban Village is predominantly concentrated in the moderate category, which suggests the presence of foundational awareness but also indicates that medicine-related preparedness remains incomplete in technical domains that are decisive during emergencies, including correct dosage, timing of administration, recognition of adverse effects, and safe storage practices. This pattern is highly relevant in flood contexts because floods routinely generate environmental and infrastructural disruption that amplifies health risks and constrains access to formal care, thereby increasing the probability that households will rely on self-care and medicine decisions within the home environment [16], [18]. From a medication-literacy perspective, “moderate” understanding can be interpreted as a transitional state in which individuals may recognise common medicines and their general purpose but may not yet demonstrate consistent competence in interpreting labels, applying dosing rules, and using medicines safely under stress and resource limitation, a condition that aligns with the proposition that educational exposure and cognitive processing shape how health information is comprehended and enacted [12], [13].

Cross-tabulation patterns provide further interpretive depth by indicating that understanding is distributed unevenly across sociodemographic strata. The modestly higher representation of women in the moderate category can be plausibly linked to gendered household roles in health management and community engagement, where women frequently act as primary decision-makers for family health needs and are more actively involved in community-based health activities, thereby potentially increasing

exposure to preparedness information [10]. This resonates with literature that positions women as key actors across pre-disaster preparedness, emergency response, and post-disaster recovery, including health and medicine-related responsibilities [8]. Age-related distributions show that younger respondents contribute substantially to moderate and high understanding categories, which is consistent with the view that younger groups are more likely to access information via digital platforms and broader communication networks, whereas older groups may rely more heavily on experience-based knowledge and face-to-face counselling, which may occur less frequently [11]. These patterns imply that risk communication for flood preparedness should not adopt a single delivery channel, but rather combine digital dissemination for younger groups with community-based counselling and practical demonstrations that remain accessible and acceptable for older adults.

Educational attainment shows the clearest gradient: respondents with university-level education are disproportionately represented in the high understanding category, a pattern consistent with educational theory and Bloom's taxonomy perspectives that higher education enhances analytical and critical thinking, thereby improving the interpretation of written instructions such as medicine labels and usage guidance [12]. In practical terms, this finding suggests that strengthening medication-related preparedness should prioritise translation of technical information into community-appropriate language and learning formats for groups with lower education, because literacy and interpretive skills directly shape the accuracy of dosing, recognition of medicine safety signals, and appropriate decision-making during emergencies [13]. Occupational patterns similarly indicate that employed respondents dominate the moderate category, which is compatible with the argument that employment status often reflects greater exposure to organisational information flows and social networks that facilitate health literacy and preparedness awareness [14], and also with evidence that knowledge levels may vary by occupational context due to differences in routine access to health information and counselling opportunities [15].

Programmatically, the results support the need for structured medication-literacy interventions that are operational rather than purely informational, focusing on what households must do before floods occur: assembling an essential emergency medicine kit, storing medicines safely, monitoring expiry dates, understanding indications and dosage, and recognising when self-care is appropriate versus when referral is necessary. Evidence from community preparedness literature indicates that preparedness improves when education is delivered through practical community-based approaches that strengthen skills and decision routines, not only awareness [18], [20]. In this regard, adopting simplified communication tools such as pocket-sized preparedness guides may be particularly effective for households because they enable rapid consultation during emergencies and support standardised, actionable steps under stressful conditions [17]. Taken together, these implications indicate that flood preparedness in Lekobalo would likely benefit from integrated strategies combining local health services and pharmaceutical personnel with community education models and simple, practical learning materials, thereby strengthening household competence for rational and safe medicine use during flood emergencies [5], [17], [20].

Limitations of the Study

Several limitations should be acknowledged when interpreting these findings. First, the study employed a cross-sectional design, which captures understanding at a single point in time and therefore cannot establish causal relationships between sociodemographic characteristics and understanding levels. Second, the use of

purposive sampling may limit representativeness and generalisability beyond Lekobalo Urban Village, particularly to communities with different socio-cultural and disaster exposure contexts. Third, the assessment relied on self-reported questionnaire responses, which are susceptible to recall bias and social desirability bias, potentially inflating reported understanding. Fourth, the analysis primarily utilised descriptive distributions and cross-tabulation; without more robust inferential modelling, the observed patterns should be interpreted as distributional tendencies rather than definitive determinants. Finally, the study did not directly measure the availability of household emergency medicine kits or observe actual medicine-use practices during flood events; therefore, the findings reflect understanding rather than confirmed behavioural implementation.

4. Conclusion

This study indicates that community understanding of household emergency medicines for flood preparedness in Lekobalo Urban Village is predominantly moderate, while a substantial proportion remains in the low category. This pattern suggests that household preparedness exists but may not yet be sufficient to support consistently safe and appropriate medicine-related decisions when access to healthcare services is disrupted during floods. Variations across sociodemographic groups highlight the need for targeted strengthening of medication-related preparedness, particularly among groups with lower understanding. Therefore, local disaster preparedness programmes should integrate structured medication-literacy education and community-based pharmaceutical counselling to enhance household readiness and reduce preventable health risks during flood events.

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Conflicts of Interest:

The authors declare no conflict of interest regarding the publication of this article.

References

[1] V. N. A. Kasim, C. R. Karim, Z. K. Yusuf, N. R. Paramata, and S. A. Ibrahim, "Nutrition management in natural disasters: increasing knowledge of factors affecting," *Disaster and Emergency Medicine Journal*, 2025. [Online]. Available: https://doi.org/10.5603/demj.103337

[2] D. D. Tolodo, M. D. Suma, N. J. Yusuf, and I. N. Manyoe, "Analysis of flooding in the Ilotidea area of Gorontalo Regency using SRTM radar image data," *Jurnal Azimut*, vol. 2, no. 1, p. 60, 2019. [Online]. Available: https://jurnal.unigo.ac.id/index.php/azimut/article/view/290

[3] H. Ernanto and S. Hermawan, "Effect of BOPO, CAR, and NPF on Mudharabah deposits in Islamic banks," *Indonesian Journal of Law and Economics Review*, vol. 14, 2022. [Online]. Available: https://doi.org/10.21070/ijler.v14i0.755

[4] Ministry of Health of the Republic of Indonesia, *Pedoman Teknis Penanggulangan Krisis Kesehatan Akibat Bencana*, Jakarta, Indonesia: Pusat Krisis Kesehatan Kemenkes RI, 2007. [Online]. Available: https://pusatkrisis.kemkes.go.id/uploads/2012/01/Pedoman-Teknis-Penanggulangan-Krisis-Kesehatan-Akibat-Bencana.pdf

[5] I. Ernawati, S. N. Permatasari, S. Y. Fazadini, and S. Nurseno, "Sosialisasi peran tenaga farmasi dalam persiapan dan pengelolaan obat serta perbekalan farmasi sebagai upaya tanggap bencana," *Martabe: Jurnal Pengabdian Kepada Masyarakat*, vol. 5, no. 3, pp. 1024–1030, 2022. [Online]. Available: https://doi.org/10.31604/jpm.v5i3.1024-1030

[6] M. Arsyad, *Disaster Management Module for Flood Disaster Management Training*, Centre for Water Resources and Construction Education and Training, 2017. [Online]. Available: https://simantu.pu.go.id/epel/edok/6cbb0_11._Modul_11_

[7] D. Deswita, S. Yuliharni, and N. N. Efniyati, "Studi kasus: Gambaran kesiapsiagaan remaja menghadapi gempa bumi dan tsunami," *Jurnal 'Aisyiyah Medika*, vol. 8, no. 2, pp. 302–311, 2023. [Online]. Available: https://doi.org/10.36729/jam.v8i2.1112

[8] G. Hedriyanti and S. AB, "Women's role in disaster management in South Sulawesi Province social services," *Jurnal Mimbar Kesejahteraan Sosial*, vol. 4, no. 2, pp. 21–37, 2021. [Online]. Available: https://e-journals.unmul.ac.id/index.php/MKS/article/view/8 663

[9] A. Sulistyowati and R. Kisdiarti, "Studi tingkat pengetahuan ibu yang bekerja tentang perkembangan sosial anak prasekolah di Desa Simogirang Kecamatan Prambon, Sidoarjo," *Nurse and Health: Jurnal Keperawatan*, vol. 6, no. 1, pp. 10–13, 2017. [Online]. Available: https://doi.org/10.36720/nhjk.v6i1.14

[10] A. P. Heriyanti Jatijajar and T. Z. Rabbani, "Community perceptions and participation in the implementation of the community-based total sanitation programme (STBM) in hamlets," vol. 24, no. 1, pp. 46–58, 2025. [Online]. Available: https://doi.org/10.14710/jkli.24.1.46-58

[11] M. Rahmawati, "The relationship between age, knowledge, education level and compliance with health protocols," *Preventif: Journal of Public Health*, vol. 14, no. 1, pp. 145–158, 2023. [Online]. Available: https://doi.org/10.22487/preventif.v14i1.335

[12] Ulfah and O. Arifudin, "Analysis of Bloom's taxonomy theory in education in Indonesia," *Al-Amar Journal*, vol. 4, no. 1, pp. 13–22, 2023. [Online]. Available: https://ojs-steialamar.org/index.php/JoE/article/view/87

[13] S. Wulandari, "Collaborative governance in landslide disaster mitigation in Bojonegoro Regency," *JIAN – Journal of Public Administration*, vol. 8, no. 1, pp. 16–26, 2024. [Online]. https://doi.org/10.20965/jdr.2025.p0530

[14] M. F. Amien, "Community perceptions of flood disaster mitigation knowledge in Gondrong Village, Cipondoh District, Tangerang City," Repository UIN Syarif Hidayatullah Jakarta, 2024. [Online]. Available: https://repository.uinjkt.ac.id/dspace/handle/123456789/78639

[15] D. E. Sitepu, A. Primadiamanti, and E. I. Safitri, "The relationship between age, occupation and education of patients and their level of knowledge of DAGUSIBU at health centres in Central Lampung," *Wahana Pendidikan Scientific Journal*, vol. 10, no. 6, pp. 196–204, 2024. [Online]. Available: https://doi.org/10.5281/zenodo.10642605

[16] Indarti, S, Insyiroh, R, and Darmi, T, "Peran Badan Penanggulangan Bencana Daerah (BPBD) Kota Bengkulu dalam Penanggulangan Bencana Banjir di Kelurahan Rawa Makmur Kota Bengkulu," *Jurnal Manajemen Publik dan Kebijakan Publik*, vol. 5, no. 2, Sep. 2023. [Online]. Available: https://jurnal.umb.ac.id/index.php/JMPKP/article/download/5202/3577/21971

[17] Woodruff, S, Meerow, S, Gilbertson, P., Hannibal, B., Matos, M., Roy, M., Malecha, M. L., and Yu, S., "Is flood resilience planning improving? A longitudinal analysis of networks of plans in Boston and Fort Lauderdale," *Climate Risk Management*, vol. 34, 100354, 2021. [Online]. Available: https://doi.org/10.1016/j.crm.2021.100354

[18] Amitasari, N, Wahyu, W, Arisanty, D, Nugroho Putro, H. P., and Anis, M. Z. A., "Community Preparedness for Flood Disasters in Karang Intan District as a Social Sciences Learning Resource," *Jurnal Pendidikan Geografi*, vol. 11, no. 1, 2024. [Online]. Available: https://doi.org/10.20527/jpg.v11i1.18301

[19] Mujiati, E, and Mutahar, R, "Risk Factors of Measles Incidence in Children Aged 1–14 Years in Metro Pusat District, Lampung Province, 2013–2014," *Journal of Public Health Science*, vol. 6, no. 2, Jul. 2015. [Online]. Available: https://jikm.ejournal.unsri.ac.id/index.php/jikm/article/view/198

[20] F. Daud, A. Adnan, A. Bahri, and A. N. Arifin, *Modul Pelatihan Mitigasi Bencana*, Global Research and Consulting Institute (Global-RCI), 2020. [Online]. Available: https://eprints.unm.ac.id/24348/2/Modul%20Pelatihan%20Mitigasi%20Bencana.pdf