The relationship between the current knowledge's satisfaction of disaster preparedness and the practice of family emergency planning

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Abstract

Background: Since the 2020 version, the content of family emergency planning (FEP) has been included in the Indonesian Maternal and Child Health (MCH) handbook. However, there is still limited information on whether pregnant women, especially those who are living in disaster-prone areas like Yogyakarta Province, practice it in their day-to-day lives.
Purpose: to analyse the relationship between the current knowledge's satisfaction of disaster preparedness and the practice of FEP among pregnant women based on the MCH handbook.
Methods: A quantitative descriptive survey with a cross-sectional design was applied in this study. Data collection was conducted between March and September 2024 using three questionnaires, which included demographic data, current knowledge's satisfaction with disaster preparedness, and practice of FEP. The samples were 277 pregnant women. Data were analysed with a chi-square test and Cramer's V test.
Results: Most of respondents reported of having quite satisfied (43.32%) with their current knowledge of disaster preparedness. As many as 135 respondents (48.73%) reported practicing FEP, but only 35.56% of them completed the practice. There is a significant relationship between the satisfaction of current knowledge about disaster preparedness with the practice of FEP, but the association is weak (p=0.04, Cramer's V=0.04).
Conclusions: The current knowledge's satisfaction with disaster preparedness and the practice of FEP has a significant relationship, but the association is weak. Policymakers need to develop disaster preparedness and FEP strategies based on the findings in the field and the identification of barriers. Health care professionals should improve pregnant women's FEP and ensure that they practice it in their daily lives through various activities such mobile reminders, group education, and integration into digital platforms.

Keywords: child health; disaster; maternal health; pregnancy

Introduction

The Special Region of Yogyakarta (DIY) Province, Indonesia, is one of the regions with a moderate Indonesian Disaster Risk Index (IRBI) category (National Disaster Management Agency, 2023). It has experienced a decrease in value from 2015 to 2022, however, the threat of natural disasters such as earthquakes, volcanic eruptions, and floods can still occur at any time. This area is prone to volcanic eruptions with the presence of an active

volcano, namely, Mount Merapi. Based on the Volcanic Eruption Risk Index, the Sleman Regency area is included in the high category. In addition, the area in the DIY Province is also passed by the Opak fault which was the source of the destructive earthquake in Yogyakarta in 2006. Based on the Earthquake Disaster Risk Index, the Bantul Regency area is included in the high category, while the Kulonprogo, Sleman, Gunung Kidul, and Yogyakarta City Regencies are included in the moderate category.

Disasters have a greater impact on vulnerable groups. Pregnant women, as one of the vulnerable groups, need to be prioritized for protection in the event of a disaster (Hapsari et al., 2020). The vulnerability is higher among women than men. In post-disaster situation, they tend to experience secondary disasters (Septanaya & Fortuna, 2023). In 2020, 484 women in DIY were victims of disasters, 3% of whom were pregnant women (Regional Disaster Management Agency of the Special Region of Yogyakarta, 2020). Pregnant women who experience disasters are vulnerable to health problems and increased rates of pregnancy-related illnesses due to the reduced mobility and changed reflexes and balance experienced during pregnancy, limited access to health centers, the risk of impaired prenatal care, and vulnerability to stress during disasters (Harville et al., 2021; Partash et al., 2022). Other risks that can occur in pregnant women during disaster situations include congenital anomalies, low birth weight, preterm birth, and reduced fetal growth (Harville et al., 2021).

Pregnant women need to face emergencies by preparing basic needs and personal needs that are adequate because maintain health and safety is very important during a disaster (US Centers for Disease Control and Prevention, 2024b). Those needs include equipment and supplies to support mental, physical, and emotional safety. Other basic needs that can be prepared include a 3-day food supply, medical and first aid equipment, prescription drugs, baby and child care supplies, and supplies for pets (US Centers for Disease Control and Prevention, 2024a).

Research on the disaster preparedness among pregnant women that includes an assessment of FEP in Indonesia is very limited. In a case study with a limited sample size of 3 people (families and pregnant women) conducted in Pasie Nan Tigo Village, Sumatra, it was reported that families with pregnant women had not prepared equipment and had not made maximum preparations when a disaster occurred (Sari, 2021). Another study conducted in Bantul, Yogyakarta, after the 2006 earthquake, showed that not a single pregnant woman identified the need for information related to the disaster (Hapsari et al., 2020). The Ministry of Health of the Republic of Indonesia has published Mother and Child Health Handbook which recommends that there be preparedness and readiness before facing a disaster (Ministry of Health of the Republic of Indonesia, 2022) In this handbook, how to prepare for FEP was explained, but there has been no evaluation of how it is practiced among pregnant women, especially in a disaster prone area. Therefore, the researcher intends to identify how pregnant women in the Special Region of Yogyakarta are prepared to face disasters. This study focuses on analysing the relationship between the current knowledge's satisfaction of disaster preparedness and the practice of FEP among pregnant women based on the MCH handbook.

Materials and Methods

Design

It was a quantitative descriptive survey with a cross-sectional design.

Sample and Setting

This research was conducted in Public Health Centres (PHC) located in 3 regencies and one city in the Special Region of Yogyakarta Province, which includes Bantul Regency, Sleman Regency, Gunung Kidul Regency, and Yogyakarta City. The selection of locations is based on the frequency of antenatal visits in 2023 and the calculation of disaster risk in the Indonesian Disaster Risk Index in 2022. The number of locations is based on considerations of the duration of the research, the availability of resources, and funding sources from the researcher. The population in this study was pregnant women who resided in regencies and cities in the Special Region of Yogyakarta Province. In this study, consecutive sampling was used as the sampling technique. The minimum number of samples was 110, calculated based on the formula from Lwanga & Lemeshow (1991) with considering a previous study that pregnant women who have prepared for an earthquake were 51.4% (Wahyuni, 2020), and 10% precision. The sample of this study is pregnant women who meet the sample selection criteria: pregnant women who undergo pregnancy check-ups at health centres, with a minimum gestational age of 20 weeks, have no chronic/metabolic/respiratory diseases, reside in the DIY Province, and has and able to operate gadgets/devices. This study involved 277 pregnant women. Samples were collected from those who met the criteria in each PHC based on the schedule of antenatal visits and the availability of resources.

Variable

The independent variable in this study was satisfaction with current knowledge of disaster preparedness, and dependent variable was the practice of FEP based on the MCH handbook.

Instruments

Instruments used in this study consisted of three parts. The first part is demographic data.

Table 1. Characteristics of respondents based on age, gestational age, and antenatal care (n=277)

Characteristics	Mean	SD
Age (years)	28.39	5.33
Gestational age (weeks)	29.16	5.55
Number of attending pregnancy check-ups (times)	7.11	2.94

Table 2. Indicators of FEP and responses from respondents (n=277)

Items	Yes (%)
Have recognized the disaster threat	53.42
Have saved important contact number	62.45
Have identified the location to turn off the water, gas, electricity	64.26
Have identified assembly point and safe point	61.37
Have learned the evacuation route	53.07
Have identified a family member who is vulnerable	62.45
Have listened to information from radio/television/online media/formal information from National Board of Disaster Management	76.17
Have prepared the disaster kit	36.82
a. Have prepared the identity card	44.76
b. Have prepared special equipment for the baby	43.32
c. Have prepared the cleaner	45.49
d. Have prepared special equipment for the mother	45.49

Table 3. Relationship between level of satisfaction of knowledge with the practice of FEP (n=277)

Level of satisfaction of knowledge	Practice of FEP		p Value	Cramer's V Value
	Yes (f)	No (f)		
Very satisfied	15	11	0.04	0.04
Satisfied	59	50		
Quite satisfied	56	64		
Dissatisfied and very dissatisfied	5	17		

Table 4. Additional equipment/food and beverages specific to region that participants would like to prepare for emergencies (n=40)

Items	f	%
Equipment		
Money	6	15.00
Clothes	2	5.00
Cell phone	1	2.50
Blanket	1	2.50
Medicine	1	2.50
Foods and beverages		
Snack food (cake, Indonesian toffee, fried fish, pecel sauce, tiwul, rice, gudeg, bak-pia)	21	52.50
Dry food (biscuit, salty fish, instant noodle, rice, meat floss)	12	30.00
Foods	2	5.00
Beverages (milk)	1	2.50

Demographic data consisting of questions such as date of birth, mother's occupation, husband's occupation, mother's last education, husband's last education, marital status, current health status, mother's medical history, health insurance ownership, gestational age, number of pregnancy check-ups that have been done, health centre where pregnancy check-ups were done.

The second part is the current knowledge's satisfaction of disaster preparedness. It is one out of four items in the experience and knowledge of disaster questionnaire. This questionnaire was developed based on Yamamoto et al. (2006) and Pangesti (2012). It consisted of 4 items: if the respondent have ever experienced a disaster (yes/no answer), the impact they feel from the disaster (no direct effect, feel the direct effect, or other), the type of disaster that is most at risk of occurring in their residential environmental (earthquake, volcanic eruption, landslides, etc), and how satisfied are they with their current level of knowledge regarding disaster preparedness measured with a Likert five-point Likert scale indicating "very satisfied", "satisfied", "quite satisfied", "dissatisfied", and "very dissatisfied". The validity test resulted in 0.42-0.72 and the reliability is 0.60 (Luthfiyah, 2020).

The third part is the FEP questionnaire that is based on the MCH handbook published by the Ministry of Health of the Republic of Indonesia 2020 version which was published in 2022 (Ministry of Health of the Republic of Indonesia, 2022). Each participant was asked whether they had created of FEP (yes/no answer). If participant answered 'yes' to the question, then we categorized it as 'have practiced the FEP'. Then, they were asked to answer whether they have done eight items as follows (yes/no answer): recognize the threat of disaster; save important contact numbers; identify locations to turn off water, gas, and electricity; identify gathering points and safe points in buildings or houses; know evacuation routes; identify vulnerable family members; listening to information from the radio/television/online media/official information from BPBD, BNPB; and preparing a disaster kit. For each question, those who answered 'yes' were scored '1' and 'no' were scored '0'. After that, if participants answered 'yes' to a question whether they have prepared a disaster kit, the next 4 questions were about the contents of the disaster kit, which include (yes/no answer): identification, special items for babies and toddlers, hygienic cleaners, and special items for pregnant/delivery/postpartum mothers. For each question, those who answered 'yes' were scored '1' and 'no' were scored '0'. If participants answered 'yes' to total of 14 questions, they were categorized as 'have completed the practice of the FEP'. There were no validity and reliability tests conducted before this study; however, it was reported that before the handbook was launched to be used by pregnant women, the trial activities were conducted. It consisted of developing and revising the MCH handbook, facility-based health worker and health worker training, and monitoring and supervising the operation of the MCH handbook at health centers (Osaki & Aiga, 2016).

Intervention

There was no intervention in this study.

Data collection

A flyer informing this study to prospective participants was made and distributed offline and online by the authors to PHCs that were chosen in this study, midwives, health cadres, professional organizations, and pregnant women, and on social media (Facebook, Instagram, WhatsApp). Google Forms was made by the authors for respondents to complete the questionnaires that could be done while waiting for their turn at antenatal check-ups at PHCs or when they were at homes. Google Forms that should be completed by the respondents comprised 2 parts. The first part explained information about this study, and the prospective respondent was asked to click the 'agree' button so that she could move to the second part, which was the questionnaire. They could complete the questionnaire within 20 to 30 minutes. Data was collected between March and September 2024.

Data analysis

Data was analysed with univariate (frequency, percentage, mean, SD) and bivariate analysis (Chi-square test and Cramer's V test). Each participant received an e-booklet about Readiness to Anticipate Disaster for Pregnant Women in Yogyakarta after completing the questionnaire.

Ethical consideration

Ethical permission was granted before data collection started from the Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada number KF/FK/0368/EC/2024.

Results

In this study, 244 out of 277 respondents (88.09%) were between 20 and 35 years old. The mean of gestational weeks was 29.16 weeks. The mean of attending ANC was 7.11 times (Table 1). More than half of the respondents have graduated from a junior high school (56%). Almost three-quarters of respondents were housewives (71.6%). The respondent's husband has a senior high school education background (53.80%) and works as a labourer (37.20%). All respondents were married and held the MCH Handbook. Almost all respondents (99.6%) have national health insurance. 53.79% participants were primigravida. 83.39% of pregnancies were planned pregnancies.

In this study, 63.90% respondents have ever

experienced of disaster which 49.15% of them reported they felt the direct impact of the disaster. The type of disaster that was at risk of occurring in their residential environmental was earthquake (83.75), volcanic eruption (11.19%), landslides (4.69%), tornado (4.69%), floods (4.33%), tsunami (2.53%), fire (0.36%), and none (4.33%). Based on the level of satisfaction with their current knowledge of disaster preparedness, 9.39% reported being very satisfied, 39.35% were satisfied, 43.32% were quiet satisfied, 7.22% were dissatisfied, and 0.72% were very dissatisfied.

In this study, 135 respondents (48.73%) reported practicing the FEP, but only 48 (35.56%) of them have completed the practice (Table 2). Based on Table 3, there was a significant relationship between the level of current knowledge's satisfaction about disaster preparedness with the practice of FEP, but the association is weak (p=0.04; Cramer's V=0.04).

In this study, 40 respondents (14.44%) reported wanting to prepare additional equipment/food and beverages. Table 4 showed that regarding equipment, participants would prepare money, clothes, cell phones, blankets, and medicine, whereas for food and beverages, they would prepare snack food, dry food, unspecified foods, and beverages.

Discussion

This study found that the current level of knowledge's satisfaction of disaster preparedness has a significant relationship with the practice of FEP, but the association is weak. This finding strengthens previous reports about knowledge and disaster preparedness. In their study, Thomas et al. (2015) reported that knowledge, including attitudes and beliefs, influences behavior and that persons with advanced knowledge were inclined to have assembled an emergency kit, created of FEP, and been alerted by the county about an emergency than those with basic preparedness knowledge. A previous study in Indonesia reported that there is a relationship between the pregnant women's experience of an earthquake and the preparedness in Bengkulu City (Silviani et al., 2022). It was reported that people's efficacy in disaster preparedness activities, have experienced disasters, and have received preparedness information positively influence the probability that they will have created of FEP (Rivera, 2020), A study in Ternate City, Indonesia, reported that disaster knowledge and preparedness attitudes have a significant positive relationship (Abdullah et al., 2024).

This study suggests that the current level of knowledge's satisfaction with disaster preparedness and the practice of FEP among pregnant women in Indonesia needs to be increased. Policymakers need to develop disaster preparedness and FEP actions based on the findings in the field. Preparing for uncertain disasters may be difficult, but the process of adjusting preparations in response to changes in local situations is important. Although FEP have introduced not only in MCH handbook but also through the government's website and social media such as X and Instagram, health care professionals should ensure that the patients read the content of FEP and practice it in their daily lives through various activities such as antenatal education, mobile reminders, group education, and integration into digital platforms. Interventions that focus on gaining knowledge based on natural disasters that patients have experienced or reflection about what they should have at home, and share the experience with other mothers and health care professionals, need to be developed.

In this study, 63.90% respondents have ever experienced of disaster which 49.15% of them felt the direct impact of the disaster. Considering that the age range of respondents were between 20 to 43 years, it was found that between 1981 to 2024, there were big earthquakes that occurred in 1981, 1992, 2001, 2004, and 2006 in Yogyakarta (Lupiyanto, 2021). In this province, each regency and city has a moderate to high risk of disaster (National Disaster Management Agency, 2023). Between January to December 2024, 833 disasters occurred in Yogyakarta that caused 2.551 houses damaged, 4.278 people affected, 44 suffer from injury, seven die, and 56 needed to be evacuated (Regional Disaster Management Agency Special Region of Yogyakarta, 2025). A study in Japan reported that 70.39% of puerperium women had had one or more disaster experiences (Ogawa S et al., 2021).

The type of disaster that is most reported as at risk of occurring in this current study was earthquake (83.75). Yogyakarta province has 11 potential disasters (Lupiyanto, 2021). Types of disaster that were not identified by respondents were extreme waves and abrasion, drought, technology failure, and social disaster. Among respondents, there were 4.33% who reported no disaster risk in their environment. This needs to be addressed because a lack of awareness of disaster risk could hinder disaster preparedness and mitigation efforts. Health personnels could ensure the disaster risk awareness through antenatal education, mobile reminders, etc.

In this study, most of the respondents reported of having quite satisfied (43.32%) with their current knowledge of disaster preparedness. This finding could not be compared with previous studies because its information is very limited. A previous study reported the negative direction relationship between the current awareness level of the community towards disaster with risk of having lower community preparedness for disaster preparedness efforts (Hargono et al., 2023). Since pregnant women have a 1.5-fold greater likelihood of requiring admission to a critical care unit and are at high risk for health complications resulting from disasters

compared to those who were not pregnant, this data can be used for public health education campaigns and to support health policymaker in increasing the preparedness and help in planning the response to the pregnant women's need during a disaster (Strid et al., 2022; Horn et al., 2024).

This study found that less than half of the respondents have practiced FEP. In addition, from this percentage, only 35.56% of them have completed the practice. This finding is specific to the context of Indonesia since the content of FEP may differ in each country. In Indonesia, the content of FEP was included in the MCH handbook in 2020 (Ministry of Health of the Republic of Indonesia, 2022). The MCH handbook is a unique perinatal healthcare initiative that was published for the first time in Japan in 1948 (Nakamura, 2019; Kyozuka et al., 2022). It helps maintain a record of women's prenatal and postnatal checkups by physicians (Kyozuka et al., 2022). In Japan, the content of disaster preparedness during pregnancy was not included in the MCH Handbook, but some local governments distribute this information in leaflets. Pregnant women who used the self-recording sections in the MCH Handbook had disaster preparedness knowledge about the recognition of the Disaster Emergency Dengon Dial 171, the cellular phone disaster message board, and a hazard map (Ogawa S et al., 2021). In Myanmar, pregnant women and their families did not have specific plans for emergencies and did not even know which health center they should refer to in case of emergency (Kyaw et al., 2023).

There was no validity and reliability test conducted before this study for the FEP instrument, but based on the data analysis of this current study, it was found that this instrument was valid (r count between 0.444 – 0.786) and reliable (Cronbach's Alpha 0.770). Respondents were categorized as having practiced the FEP if they answered 'yes' to a question of whether they had created of FEP. Then, if respondents answered 'yes' to all 12 questions related to the practice of FEP (total score was 12), they were categorized as having complete practice of FEP. Based on this finding, the FEP instrument is recommended to be used for future studies related to the practice of FEP among pregnant women, especially in the context of Indonesia.

Indonesian MCH handbooks have been reported in several studies in terms of persons involved, variables being investigated, and types of disasters, but none have investigated how they guide pregnant women to practice the FEP. Further study is needed to confirm the findings of this current study and to further investigate the factors that contribute to the practice of FEP. Especially now that the 2024 version has been published by the Ministry of Health of the Republic of Indonesia. Based on the findings of the current study, healthcare personnels should improve pregnant women's FEP and encourage them to start the practice, for example, with antenatal care education, mobile reminders, family counselling, etc.

The number of FEP indicators was different in each country. In Indonesia MCH Handbook 2020 version, there were eight indicators (Ministry of Health of the Republic of Indonesia, 2022). In Hawaii, FEP for postpartum mothers includes eight behaviours, namely having enough supplies at home for at least seven days, having an evacuation plan for their child(ren), having methods to keep in touch, having an emergency meeting place, having an evacuation plan to leave home, having emergencies supplies to take with if they have to leave quickly, having copies of important documents, and having practiced what to do. It was reported that 79.3% reported at least one preparedness behavior, and 11.2% performed all eight behaviors (Strid et al., 2022).

In this study, 14.44% of respondents reported that they want to prepare additional equipment/ food and beverages. Money, clothes, cell phones, blankets, and medicine were listed by participants as the equipment they would like to prepare for emergencies. All those equipments was important to be prepared for disaster preparedness. It has been included in Household Emergency Preparedness (Heagele et al., 2022). Additionally, snack food (cake, Indonesian toffee, fried fish, pecel sauce, tiwul, rice, gudeg, bakpia) was listed by 52.5% of respondents while dry food (biscuit, salty fish, instant noodle, rice, meat floss) was listed by 30% of respondents as the food that they would like to prepare for emergencies. Based on these findings, education related to the choice of foods to be prepared for emergencies needs to be implemented in the future because during a disaster, safe, quality, and nutritious food may be very difficult to find but a safe, palatable, easy to deliver, easy to use, and nutritionally complete should be provided. Local food is one of the local wealth in an area and is acceptable culturally to the people (Pribadi et al., 2021; Penafiel et al., 2016). Providing formula food that is ready to eat made from local foods that are commonly consumed by local people needs to be anticipated and researched (Agustini et al., 2022).

Strength and limitation of the study

The limitations of this study include respondents who have not yet covered all PHCs in regencies and cities in Yogyakarta. Some participants completed the questionnaires independently or with help from researchers while they were waiting for antenatal check-ups in PHCs, whereas others completed the questionnaires online from their homes.

Nursing implication

This study contributes in providing detailed information about the current knowledge's satisfaction and the practice of FEP among pregnant women living in disaster-prone areas. Based on these findings, nurses from various fields of study,

such as community health nursing, maternity nursing, pediatric nursing, and disaster nursing should improve the pregnant women's knowledge of FEP to increase their level of knowledge satisfaction and practice FEP. Nurses could use the FEP instrument to regularly assess the practice of FEP while providing nursing care for pregnant women.

Conclusions

In conclusion, there is a significant relationship between the level of current knowledge satisfaction with disaster preparedness with the practice of FEP, but the association is weak. Information about disaster preparedness was available in the Indonesia MCH handbook that was distributed nationally, however, its utilization among pregnant women still needs to be improved. Further study is needed to investigate the factors that are related to the knowledge and practice of FEP. Exploration that focuses on gaining knowledge based on natural disasters that patients have experienced or reflection about what they should have at home, sharing the experience with other mothers and health care professionals need to be developed. Preparing for uncertain disasters may be difficult, but the process of adjusting preparations in response to changes in local situations is important. Health care professionals should improve pregnant women's FEP and ensure that the patients read the content of FEP and apply it in their daily lives through various activities such as antenatal education, mobile reminders, etc.

Declaration of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

References

Abdullah, I., Maryani, E., & Ningrum, E. (2024). Analysis of the level of knowledge of disaster preparedness attitudes in dealing with the Gamalama volcano disaster among students in senior high schools in the city of Ternate. E3S Web of Conferences, 600. https://doi.org/10.1051/e3sconf/202460002016

Agustini, N. P., Puryana, I. G. P. S., & Mataram, I. K. A. (2022). Modification of traditional Balinese food as disaster emergency food. *Jurnal Nutrisia, 24*(1), 40–47. https://doi.org/10.29238/jnutri.v24i1.268

Hapsari, E., Jayanti, R., Nugraheni, D., & Panuntun, R. (2020). Information needs in pregnant women living in disaster prone area. *Enfermeria Clinica, 30,* 80–86. https://doi.org/10.1016/j.enfcli.2019.12.032

Hargono, A., Artanti, K. D., Astutik, E., Widodo, P. P., Trisnawati, A. N., Wardani, D. K., & Lioni, E. (2023). Relationship between disaster awareness and disaster preparedness: Online survey of the community in Indonesia. *Journal of Public Health in Africa, 14*(9), 1–8. https://doi.org/10.4081/jphia.2023.2376

Harville, E., Beitsch, L., Uejio, C., Sherchan, S., & Lichtveld, M. (2021). Assessing the effects of disasters and their aftermath on pregnancy and infant outcomes: A conceptual model. *International Journal of Disaster Risk Reduction, 62*. https://doi.org/10.1016/j.ijdrr.2021.102415

Heagele, T. N., McNeill, C. C., Adams, L. M., & Alfred, D. M. (2022). Household emergency preparedness instrument development: A Delphi study. *Disaster Medicine and Public Health Preparedness, 16*(2), 570–582. https://doi.org/https://doi.org/10.1017/dmp.2020.292

Horn, C., Bam, N., & Matsipane, M. (2024). Exploring disaster preparedness in an obstetric unit in a district hospital in the Western Cape Province. *BMC Health Services Research, 24*(1), 1–2. https://doi.org/10.1186/s12913-024-11104-x

Kyaw, H., Than, K., Diaconu, K., & Witter, S. (2023). Community stressors and coping mechanisms in accessing the health system during a double crisis: a qualitative case study from Yangon Region, Myanmar. *International Journal for Equity in Health, 22*(1). https://doi.org/10.1186/s12939-023-01851-4

Kyozuka, H., Murata, T., Yasuda, S., Ishii, K., Fujimori, K., Goto, A., Yasumura, S., Ota, M., Hata, K., Suzuki, K., Nakai, A., Ohira, T., Ohto, H., & Kamiya, K. (2022). The effects of the Great East Japan Earthquake on perinatal outcomes: Results of the pregnancy and birth survey in the Fukushima Health Management Survey. *In Journal of Epidemiology, 32,* S57–S63. Japan Epidemiology Association. https://doi.org/10.2188/jea.je20210444

Lupiyanto, R. (2021, September 22). History of earthquakes and the wisdom of the Specialty of Yogyakarta earthquake. https://sejarah.dibi.bnpb.go.id/artikel/sejarah-gempa-dan-hikmah-keistimewaan-bumi-yogyakarta/13

Luthfiyah, J. S. L. (2020). Validity and reliability test of disaster preparedness instruments for pregnant women in Special Region of Yogyakarta [Undergraduate Thesis, Universitas Gadjah Mada]. https://etd.repository.ugm.ac.id/penelitian/detail/190987

Lwanga, S. K., & Lemeshow, S. (1991). Sample size determination in health studies: A practical manual. World Health Organization. https://iris.who.int/bitstream/handle/10665/40062/9241544058_(p1-p22).pdf

Ministry of Health of the Republic of Indonesia. (2022). Maternal and child health handbook.

National Disaster Management Agency. (2023). IRBI: Indonesia Disaster Risk Index Year 2022 (Ridwan Yunus, Ed.). Badan Nasional Penanggulangan Bencana. https://inarisk.bnpb.go.id/pdf/BUKU%20IRBI%202022.pdf

Ogawa S, Hayashi K, & Shinozaki H. (2021). Association between the Use of Self-recording Sections of the Mother and Child Health Handbook and Disaster Preparedness of Mothers in Japan. *The Kitakanto Medical Journal, 71*(1), 19–25. https://doi.org/http://dx.doi.org/10.2974/kmj.71.19

Osaki, K., & Aiga, H. (2016). What is maternal and child health handbook? https://www.jica.go.jp/Resource/english/our_work/thematic_issues/health/c8h0vm0000f7kibw-att/technical_brief_mc_01.pdf

Pangesti, A. D. H. (2012). Descriptive study about knowledge level of disaster preparedness and its applications among nursing students in University of Indonesia year 2012 [Undergraduate thesis, University of Indonesia]. In FIKUI. https://lib.ui.ac.id/file?file=digital/old29/20313898-S42573-Gambaran%20tingkat.pdf

Partash, N., Naghipour, B., Rahmani, S. H., Pashaei Asl, Y., Arjmand, A., Ashegvatan, A., & Faridaalaee, G. (2022). The impact of flood on pregnancy outcomes: A review article. *In Taiwanese Journal of Obstetrics and Gynecology, 61*(1), 10–14. Elsevier Ltd. https://doi.org/10.1016/j.tjog.2021.11.005

Penafiel, D., Termote, C., Lachat, C., Espinel, R., Kolsteren, P., & Van Damme, P. (2016). Barriers to eating traditional foods vary by age group in Ecuador with biodiversity loss as a key issue. *Journal of Nutrition Education and Behavior, 48*(4), 258-268.e1. https://doi.org/10.1016/j.jneb.2015.12.003

Pribadi, N. H., Saddhono, K., & Suhita, R. (2021). The power of local foods in the Kebo-Keboan traditional ceremony of Alasmalang, Banyuwangi, Indonesia: A philosophical study and cultural promotion. *Food Research, 5*(6), 72–79. https://doi.org/10.26656/fr.2017.5(6).757

Regional Disaster Management Agency of the Special Region of Yogyakarta. (2020). DIBI Yogyakarta Special Province 2020. Regional Disaster Management Agency of the Special Region of Yogyakarta. https://bpbd.jogjaprov.go.id/assets/public/DIBI%20Yogya_2020.pdf

Regional Disaster Management Agency Special Region of Yogyakarta. (2025, February 14). 2024 disaster infographic Yogyakarta Special Region: January 1 - December 31, 2024. https://bpbd.jogjaprov.go.id/assets/uploads/1__Infografis_Tahunan_2024_per_14022025.pdf

Rivera, J. (2020). The likelihood of having a household emergency plan: understanding factors in the US context. *Natural Hazards, 104*(2), 1331–1343. https://doi.org/10.1007/s11069-020-04217-z

Sari, M. (2021). Case study: Family preparedness with vulnerable groups of pregnant women in facing earthquake disaster [Undergraduate thesis, Andalas University]. http://scholar.unand.ac.id/93410/5/MINAH%20SARI_2041312029_KIA%20LENGKAP_.pdf

Septanaya, I. D. M. F., & Fortuna, S. (2023). Gender mainstreaming efforts in disaster management plans: Case study West Nusa Tenggara Province, Indonesia. *International Journal of Disaster Risk Reduction, 87,* 103576. https://doi.org/10.1016/j.ijdrr.2023.103576

Silviani, Y. E., Fitriani, D., & Regita, R. (2022). The relationship between disaster experience and preparation of pregnant women in the face of earthquake disasters. *Jurnal Sains Kesehatan, 29*(1), 55–62. https://doi.org/https://doi.org/10.37638/jsk.29.1.55-62

Strid, P., Fok, C. C. T., Zotti, M., Shulman, H. B., Awakuni, J., House, L. D., Morrow, B., Kern, J., Shim, M., & Ellington, S. (2022). Disaster preparedness among women with a recent live birth in Hawaii-Results from the Pregnancy Risk Assessment Monitoring System (PRAMS), 2016. *Disaster Medicine and Public Health Preparedness, 16*(5), 2005–2014. https://doi.org/10.1017/dmp.2021.274

Thomas, T. N., Leander-Griffith, M., Harp, V., & Cioffi, J. P. (2015). Influences of preparedness knowledge and beliefs on household disaster preparedness. *Centers for Disease Control and Prevention MMWR: Morbidity and Mortality Weekly Report, 64*(35), 965–971. https://www.cdc.gov/mmwr/pdf/wk/mm6435.pdf

US Centers for Disease Control and Prevention. (2024a, April 18). Personal Needs. https://www.cdc.gov/prepare-your-health/take-action/personal-needs.html?CDC_AAref_Val=https://www.cdc.gov/prepyourhealth/takeaction/personalneeds/index.htm

US Centers for Disease Control and Prevention. (2024b, May 15). Safety messages for pregnant, postpartum, and breastfeeding women during natural disasters and severe weather. https://www.cdc.gov/reproductive-health/emergency-preparation-response/safety-messages.html

Wahyuni, S. (2020). The influence of pregnant women's preparedness in facing earthquake and tsunami disasters in the working area of Lhoknga Community Health Center, Aceh Besar Regency in 2019. *Jurnal Aceh Medika, 4,* 75–79. www.jurnal.abulyatama.ac.id/

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Yamamoto, A., Kudo, Y., Watanabe, S., Nakayama, A., Nishimura, M., Nozawa, M., & Yasunari, T. (2006). Be prepared before a disaster strike, nursing care for pregnant women, postpartum mothers, newborns in the community. University of Hyogo: 21st Century COE Program Development of a Center of Excellence for Disaster Nursing in a Ubiquitous Society, Project for Development of Maternal Nursing Care Methods.