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Desire to Have Children Reviewed from Reproductive Health as the Impact of Natural Disasters in Palu, Indonesia

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ABSTRACT

The impact of the disaster has reduced reproductive health services to women's health and welfare. Demographically, disasters with high mortality rates can change women's birth preferences thereby contributing to an increase in births. An earthquake measuring 7.4 on the Richter scale shook central Indonesia, in Palu City to be precise, accompanied by a tsunami and liquefaction with 2,227 people killed and 965 people missing including children, and 2,537 injured. This research tries to see the extent of the role of reproductive health in the high desire to have children after the disaster, where previous research found that some areas affected by the disaster experienced an increase in fertility rates. This study aims to determine the effect of reproductive health (age, history of pregnancy, history of contraception, and parity) on the desire to have children, including their chances, and to map mothers who wish to have children after a disaster. This type of research is a survey research with a cross-sectional design. Participants in this study 382 respondents. Data analysis used the chi-square test and logistic and spatial regression analysis with an overlay approach to map the distribution of respondents who wanted to have children. The results showed that age, history of pregnancy, and contraception affected the desire to have children, with P values = 0.004, 0.043, and 0.037 which were less than 0.05. The odds ratio results show that the mother's age, history of pregnancy, and history of contraception have a probability of 0.532, 0.421, and 0.630 times the desire to have children after the disaster in Palu City. The results of the sample distribution of the desire to have children through mapping the location of the coordinates showed that most of them had the desire to have children, namely 234 respondents.

1. INTRODUCTION

Geographical impacts can cause instability, risk, and uncertainty in the population process for people in an area, such as natural disasters [1]. An earthquake measuring 7.4 on the Richter scale rocked the central part of Indonesia, precisely in the city of Palu, on 28 September 2018, accompanied by a tsunami and the emergence of a new phenomenon, namely liquefaction or moving ground. Liquefaction, known as moving land, has buried many residents and their homes in the Balaroa Housing Center and Petobo Village. The disaster resulted in 2,227 casualties, 965 people missing, and 2,537 injured [2].

Natural disasters seriously threaten safety, security, welfare, and public health. The impact of natural disasters on the human condition causes fundamental health problems and complications, including reproductive health problems. Disasters can also increase vulnerability to poor reproductive health outcomes among affected populations by reducing access to reproductive health services due to damaged health facilities and inadequate human resources, including exposure to sexual violence and poverty. After a disaster, many factors can influence birth outcomes, including maternal health history, environmental and behavioral characteristics, and sociodemographic factors such as ethnicity, age, and marital status [3-8].

The effects of the disaster led to reduced reproductive health care on the health and well-being of women. Reduced contraceptive access may force women to change their choice of contraceptive methods from being more effective to less effective or stop using contraception. Unmet needs for family planning make women more vulnerable to unwanted pregnancies [9]. Natural disasters can disrupt women's access to contraceptive services, thus motivating couples to become pregnant [10].

Natural disasters also affect social and other factors related to women's reproductive health, including contraceptive use [11]. Demographic research shows that high-mortality disasters can also change women's birth preferences to contribute to increased births. Changing birth preferences after a disaster makes women want to replace deceased family members or compensate for family and community losses [12].

It should be noted that the catastrophic effects on reproductive health can develop in the relationship of stress in women with poor birth outcomes [13]. Disaster is one external stressor associated with changes in population birth outcomes. High births with poor results, such as low birth weight (LBW) and increased preterm birth, are the events that have been documented following natural disasters, chemical disasters, and terrorism [14]. Changes in post-disaster birth outcomes are

linked to exposure to women both to environmental radiation and psychosocial stress associated with disasters. What remains unclear is the period between exposure to birth outcomes [15].

The relationship between disasters and women's reproductive health still creates different perceptions. Disasters have been associated with post-disaster birth changes. Still, several studies differ, meaning that one study found an increase in post-disaster births while another decreased the birth rate [16]. Research by Kissinger et al. [17], in women aged 16-24 years, as many as 55 people where this study was conducted 5 - 6 months after Hurricane Katrina. It was found that 22 (40%) women stated that they did not use contraceptives during sexual intercourse, and 2 (4%) women experienced unwanted pregnancies due to a lack of access to Contraception [17]. A study conducted on 195 women aged 12–49 years whose condition was still displaced for approximately six years after Hurricane Katrina stated that 62% of women did not use contraceptives. However, no information was provided about their contraceptive behavior before the disaster or their desire to become pregnant [18].

The purpose of this study was to determine how much influence reproductive health (age, history of pregnancy, history of contraception, and parity) has on the desire to have children, calculate the mother's chances of having children and map the distribution of mothers who want to have children after the earthquake, tsunami and liquefaction in Palu.

2. METHOD

2.1 Study design and sample

This survey research with a cross-sectional study method was conducted in Palu City. Participants in this study amounted to 382 mothers included in the inclusion criteria, namely Couples of Childbearing Age (PUS) affected by natural disasters. This sample was taken from five sub-districts in Palu, the areas most severely affected by natural disasters such as earthquakes, tsunamis, and liquefaction. Samples were taken randomly using the proportional stratified random sampling technique.

2.2 Procedures

Respondents selected to participate in the research were given information about the aims and objectives of the study. After they agree, they sign a written consent form. Each respondent answered the questionnaire related to the desire to have children, reproductive health consisting of pregnancy history, contraception, and parity. Then make observations and documentation to determine the coordinates of the respondents when a disaster occurs by using a GPS (Global Positioning System) on a cellphone with an open camera application. Mark Harman developed the available camera. This application can be used on almost all phones with ICS Android and above. Coordinate points were taken during the post-disaster research by asking for their time and willingness to go together to their homes that were destroyed when the disaster occurred, especially for respondents who lost their homes and occupied temporary and permanent housing provided by the Palu City government. Meanwhile, for respondents who lived in their homes because they did not experience severe damage to their houses, the coordinates were determined in the house at the time of the study.

2.3 Data analysis

Data analysis used univariate statistics to look at the characteristics of respondents, the bivariate analysis used the chi-square test to see the effect of reproductive health on the desire to have children after the disaster occurred, and multivariate analysis to calculate the probability of each variable (odds ratio). Furthermore, using spatial analysis to map the distribution of respondents who want and do not want to have children with the overlay method approach.

3. RESULTS

Socio-economic development is needed as an integral part of national development, especially after a disaster. In addition to causing physical damage and casualties, natural disasters also have an impact on the socio-economic community. On a certain scale, disasters can paralyze the economy by destroying infrastructure, disrupting communication networks, crop failures, and disease outbreaks, including reproductive health problems in women. Socioeconomic development has a positive influence on reproductive health in the birth process. Socioeconomic status is a consistent and reliable predictor of health disparities, including determining birth decisions [19].

This article describes the socio-economic characteristics that include maternal age. The ages used in this study were 15-49 years which were grouped into three groups, namely the age group <20 years, 20-35 years, and >35 years. The division of these age groups is based on the age group at risk in reproductive health, namely the age of the mother to get pregnant. Furthermore, education is divided into five groups, namely not graduating from elementary school, graduating from elementary school, graduating from junior high school, graduating from high school, and tertiary education. Next is employment status, namely for respondents who work and do not work. Furthermore, the income based on the district/city average minimum wage (UMR) set by the Palu City government is 2,620,989 rupiah which is divided into two groups, namely for respondents whose income is below 2,620,989 rupiah which is not according to the UMR and respondents whose income is 2,620. 989 rupiah or more is called appropriate. Then the last one is ethnicity which is divided into original ethnicity and migrants. The explanation of the table consists of the characteristics, n = number of respondents and % = the number of percentages of the number of respondents. The research findings based on the socioeconomic characteristics of the respondents are as follows:

Table 1. Socioeconomic characteristics

Characteristics		n	%
Age	< 20 Years	5	1.3
	20 – 30 Years	185	48.4
	>35 years	192	50.3
Education	Did not pass elementary school	4	1
	Graduated from elementary school	78	20.4
	Graduated from Middle School	87	22.8
	Graduated from high school	164	43

	College	49	12.8
Profession	Does not work	287	75.1
	Work	95	24.9
Income	It is not following	304	79.6
	In accordance	78	20.4
Ethnicity	Original	210	55
	Comer	172	45

Source: Primary Data Processing 2022

The age in this study is the mother's age, who is included in the group of fertile couples (PUS). Teams of Childbearing Age (PUS), which ranges from 15 - 49 years, where the partner (male and female) is mature enough in all respects, especially the reproductive organs are functioning properly [20]. The respondents' age was grouped into three groups, namely <20 years, 20-35 years, and >35 years. Table 1 shows that of the 382 respondents studied, the highest age group was >35 years old by 50.3%, while respondents with the lowest age group were <20 years old, namely 1.3%. The age grouping of respondents is based on the age group at risk and not at risk of having children; the age group at risk is <20 years and >35 years, while the recommended age group is 20-35 years. Education is divided into five categories: not graduating from elementary school, graduating from elementary school, graduating from junior high school, and graduating from high school and college. The results showed that most of the respondents with education graduated from high school, namely 43%, and the lowest did not graduate from elementary school, namely 1%, as shown in Table 1. The work was divided into two groups, namely working and not working. The results showed that most respondents did not work as much as 75.1% and worked 24.9%. The respondent's income is based on the Average Minimum Wage (UMR) of Palu City, which is 2,620,989 rupiah [21]. Ethnic groups are divided into two groups: the original ethnic Kaili and ethnic immigrants (Bugis, Javanese, Gorontalo, Buol, Tolitoli, Arab, Chinese, and others). The study found that most ethnic groups were indigenous at 55%, while immigrants amounted to 45%.

The results of the analysis of the variable relationship between age, pregnancy history, contraceptive history, and parity with the desire to have children can be seen in Table 2.

The chi-square statistical test results found that the age variable had a very significant relationship with the desire to have children, with a significance value of <0.05 or 0.004. Furthermore, the history of pregnancy and contraception also had a substantial connection with the desire to have children, with a significance value of 0.043 and 0.037, respectively. Maternal parity is not associated with the desire to have children because the significance is >0.05 or 0.344.

Based on Table 2, the age group 20-35 years wants more children by 69.19% compared to the age group <20 years and >35 years. However, one observes that the total age group >35 years also has a high tendency to have children, namely 53.12%. Search results in the field showed that most of these groups experienced the death of a family member including their child when the disaster occurred, so they decided to have another child, even though their age was at high risk for pregnancy.

Assessment of a history of at-risk pregnancies used Rohyati's [22] standard assessment which is used as a family-based antenatal screening tool to find risk factors for pregnancy. Based on the research findings, the history of pregnancy group with low risk had a high desire to have children at 66.85%. However, it should be noted that the number of those who wish to have children in groups with a history of high-risk pregnancies is also 53.12% greater than those who do not want children, this cannot be ignored because it can endanger the mother and her child during pregnancy and childbirth. Such conditions can be exacerbated by the psychology of those who have just experienced the loss of their family, including their children, when a disaster occurs, which of course will have an impact on their pregnancy.

The history of contraception shows that the number of groups using contraception is 66.84% more interested in having children than those who do not want to have children, even though they are active contraception users. Based on findings in the field some of these users are those who lost their children when the disaster occurred, even though the trauma is still there, their desire to have is higher and as a consequence, they are willing to give up the contraception they are currently using.

In general, the results of the logistic regression test showed that there was a significant influence between maternal age, history of pregnancy, and contraception on the desire to have children after the disaster in Palu City, where the mother's age, history of pregnancy, history of contraception had the opportunity to have the desire to have children after the disaster in Palu City.

Table 2. Analysis statistic chi-square test and logistic regression models for the desire to have children

Variable	Desire to Have Children		Chi-Square Test	Logistic Regression	
	Total	%Yes	p=value	OR (95%CI)	p=value
Age					
<20 years	4	80	0.004	0.5 (0.3 - 0.8)	0.003
20 – 30 years	128	69.19			
>35 Tahun	102	53.12			
Pregnancy history					
Low risk	121	66.85	0.043	0.6 (0.4 - 0.9)	0.044
High risk	113	56.22			
Contraception history					
Use	125	66.84	0.037	0.6 (0.4 - 0.9)	0.034
Never/don’t use	109	55.90			
Parity					
Normal	173	62.91	0.344		
Risky	61	57.01			

Source: Primary Data Processing 2022

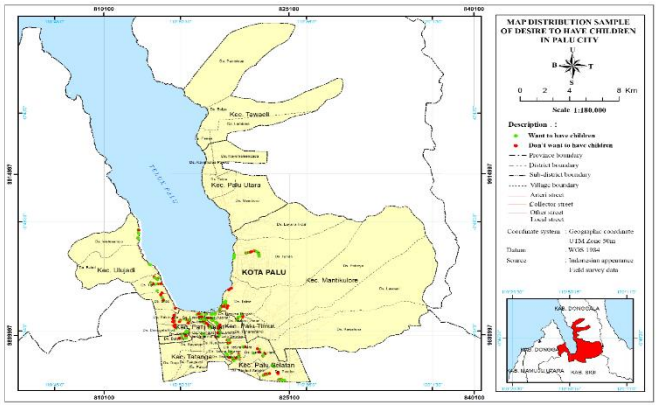

Figure 1. Map of the distribution of the desire to have children in Palu

During the research, the desire to have children was tested in the field where each polygon was surveyed by interviewing whether they wanted to have children or not. Then determine the coordinates of each respondent affected by the earthquake, tsunami, and liquefaction. At the time of determining the coordinates, some of the respondents occupied temporary housing and permanent shelter provided by the government because their homes had been destroyed by the tsunami and liquefaction, namely around 99 (25.92%) of the respondents. To get the coordinates by asking for their willingness and time to show their homes that were destroyed when the disaster occurred (where they lived at the time the disaster occurred). Meanwhile, taking coordinates was carried out directly at their place of residence for respondents who did not experience damage to their houses and still occupy them, namely 283 (74.08%). The map in Figure 1 shows the sample distribution of respondents who want to have children in the city of Palu after the disaster, the green dots are respondents who want children, and the red dots are mothers who don't want to have any more children. If you look at the distribution, it is almost even, but the group that wants to have children is higher, namely 234 respondents compared to 148 respondents who do not want to have children.

4. DISCUSSION

This study is one of the studies that consider the impact of natural disasters on births in Palu City. This study tries to see whether the mother's age, history of pregnancy, history of contraception, and parity are related to the desire of the mother to have children. The results of the chi-square analysis performed showed that three variables, namely age, history of pregnancy, and history of contraception, were related to the desire to have children. The results of the odds ratio show that the age factor of the mother has a chance of having a child which is dominated by the age group of 20-35 years, the history of pregnancy between low-risk and high-risk mothers has a chance of having children, as well as a history of contraception where mothers who use contraception are more dominant having children after the disaster in Palu City. Although the 20-35-year-old group wanted more children, this was because most of the respondents had the intention to have before the disaster and some of them only had one or two children.

Likewise with the age group less than 20 years where most of them did not have children so they wanted children before the disaster occurred even though in this group there was a high risk of becoming pregnant. Then what is interesting is that there are also many in the age group over 35 years who want to have children, even though reproductively this group is at risk of having children. Based on the findings in the field, many of these age groups stopped using contraception, both temporarily due to limited access to post-disaster services and some who deliberately stopped contraception because they decided they wanted to have children because some of them experienced child loss and death.

Research by Zhu et al. [23] examined births in older women after discontinuation of intrauterine device (IUD) contraception after the earthquake in Wenchuan, where it was found that 80.11% or 1418 respondents from a total of 1770 respondents studied experienced pregnancy after IUD removal, and about 1256 respondents have been pregnant in the last one year. Pregnant women belong to the age group over 35 years [23]. Likewise, the age group of 20-30 years in India experienced the most significant increase in deliveries after the earthquake, which was 3.1%. Births also increased in younger women (≤20 years) by 2.3% and women with older age (>30 years) by 1.1%. For 2000–2004, the estimated Total Fertility Rate (TFR) data are 2.18 and 2.74 in areas with and without a tsunami disaster. After the tsunami, the birth rate by zone changed, wherein mortality in the community increased, especially for women aged 20–34. The overall figures for 2006–2009 were TFRs of 2.67 and 2.52, respectively [12]. Different from the research results of Magnus et al. [24] that mothers who have a low risk but at the time of a disaster have a high chance of wanting to have children by 1.674 times and mothers who live in disaster-prone areas are 1.293 times likely to want to have children.

The study results found that most of the pregnancy history of low-risk mothers wanted to have children, as many as 125 respondents. Mothers with low risk have a safe chance of getting pregnant and giving birth, especially in a disaster. Women are limited access to healthcare workers and facilities. Raschky & Wang's [7] research on reproductive behavior at the edge of the world: the effects of Cuban missiles and the birth crisis in the United States found that women affected by the catastrophic war were more likely to engage in reproductive activities, including pregnancy and childbirth when they faced a high risk of death. The low desire to have children in respondents who have an increased risk of pregnancy history is influenced by several things, such as a history of miscarriage, women who are at risk of miscarriage can increase the risk of having a previous pregnancy ending in a miscarriage compared to women without the risk. The trouble is also more significant for women with a history of neonatal death, although the numbers are small and estimates are less precise. Pregnancy complications and other adverse outcomes with previous pregnancy history also increase the risk of miscarriage, including if the last live birth was preterm and a history of gestational diabetes and cesarean section [25].

The history of contraception has a relationship with the desire to have children. Still, it is interesting that respondents currently using contraception have a higher desire to have children, namely as many as 125 respondents compared to those who have or do not use them. The results differ from Zhu et al. [23], which state that women who discontinued IUD contraception after the Wenchuan disaster had a higher birth rate than those who used it [14]. The evidence regarding the desire to become pregnant after discontinuing contraception is inconclusive, including after a disaster. Delay in pregnancy after discontinuation of contraception

remains a significant concern for women using contraception. Especially women who have experienced post amenorrhea when using pills and discontinuation of contraception have fertility problems and experience failure to get pregnant. In addition, it should be noted that the delay or decrease in pregnancy due to previous contraceptive use can lead to dissatisfaction and decreased use of contraceptives [25].

The results showed that parity was unrelated to the desire to have children. This study differs from the Rabbi study, which examines factors affecting fertility preferences in developing countries during demographic transition. Evidence in Bangladesh, where it was found that 84.4% of couples who had one child were attracted to having another child. Only 33.3% of the teams with two children had more children, while only 12% had the desire to have more children. Besides, parity is also influenced by abortion history and choice of sex [26]. Likewise, Nobles et al. [12] found that 27% of women gave birth to another child after the tsunami. Although the figure was higher for those who lost children, the difference was not statistically significant compared to those who did not. Concerning demographic factors and other socioeconomic features (previous fertility, age, and education), women who lost children were no different from women whose children survived [12].

This study still has many shortcomings and limitations related to the cross-sectional method. Data collection is instantaneous and concurrent and calculated based on existing statistics. Respondents' responses and answers may be influenced by existing conditions and other factors affected by post-disaster trauma. A qualitative approach with in-depth interviews is highly recommended in this study. Involving husbands and families is very helpful in providing answers and responses to why they want and do not want to have children after the disaster in Palu city.

5. CONCLUSIONS

The results showed that reproductive health consisting of age, history of pregnancy, and history of contraception influenced the desire to have children. Based on logistic regression analysis, it shows that age, history of pregnancy, and history of contraception have a risk for wanting to have children. The results of the sample distribution of the desire to have children through mapping the location of the coordinates showed that most of them had the desire to have children, namely 234 respondents.

The results of this study are expected to be a reference or guideline for the development of the reproductive health of women who experience disasters so that they can predict the desire to have children if they occur in other places with the same type of disaster. In addition, the results of this study can be used as a database for the government and related agencies such as the health office and community health centers in the Palu City area as information material for mothers who want to have children after a disaster by identifying mothers who want to get pregnant or are undergoing pregnancy for monitoring and evaluation as well as assisting pregnant women to prevent complications of pregnancy and prepare adequate referral services.

In this study, there are still many weaknesses or limitations, namely in this study using a quantitative approach with data collection carried out using a questionnaire. The form of a short answer by choosing an answer based on a choice of questions certainly requires honesty based on understanding what the respondent wants. In the future, a research model with a qualitative approach is urgently needed to further explore the extent to which respondents desire to have children after the disaster from the perspective of reproductive health and the role of the family, especially husbands, in supporting the decision to have children.

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