

Analysis of maternal mortality rate based on maternal and child health (KIA) Coverage program in Aceh from 2015 to 2017

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Abstract. Maternal Mortality Rate (AKI) in Aceh from 2012 to 2015 experienced a significant decline, but in 2016 AKI increased again to 167 per 100,000 live births. In an effort to reduce AKI, the recording and reporting system is a very important component. The results of the monitoring and evaluation are very important for decision making at a higher level that it can impact the health status of the community. This study aims to analyze maternal mortality rates with the coverage of KIA program in Aceh from 2015 to 2017. The type of research used ecological studies or population correlation studies which is a study between two or more variables without any attempt to influence these variables so there is no variable manipulation. The study was conducted at the Aceh Health Office in the Public Health and Nutrition Health Section. Sources of data in this study were all PWS KIA data from 2015 to 2017 derived from reports from 23 Districts / Cities Health Offices. The unit of analysis was District / City in 2015 to 2017 (N = 69). Data analysis was done using Pearson correlation test and linear regression using computer program. The results showed that there was a significant relationship between K1 visits (p value: 0.001), K4 visits (p value: 0.01), administration of Fe1 (p value: 0.001), administration of Fe3 (p value: 0.0002), delivery assistance by health workers (p value: 0.049), postpartum KF1 visits (p value: 0.044) and postpartum visit KF2 (p value: 0.032). Multivariate Test results obtained K4 visits (p value 0.007) which were most significantly related to maternal mortality. Improving the quality of service to mothers from pregnancy to childbirth, starting from examinations during K1 and K4 visits to postpartum KF1 postpartum visits, thus they can be detected and treated immediately / referred if there are health problems for pregnant / postpartum women, maternal death can be prevented.

Keyword. AKI, PWS KIA, K1, K4

Introduction

The Maternal and Child Health Program (KIA) is one of the priorities of the Ministry of Health and the success of the KIA program is one of the main indicators in the 2005-2025 National Long-Term Development Plan (RPJPN).¹

According to the World Health Organization (WHO) in 2014 the number of AKI in Indonesia was still the highest in ASEAN, which was 214 per 100,000 live births. This figure was higher than other ASEAN countries such as the Philippines, 170 per 100,000 live births, Vietnam 160 per 100,000 live births, Thailand 44 per 100,000 live births, Brunei Darussalam 60 per 100,000 live births and Malaysia 39 per 100,000 live births.² Based on the Indonesian Health Demographic Survey (SDKI) in 2016, the maternal mortality rate in Indonesia

reached 235 per 100,000 live births, a significant change compared to 2015.³

In Aceh, the AKI from 2012 to 2015 decreased significantly, where in 2012 it was 184 per 1000 live births, in 2013 it fell to 158 per 1000 live births, in 2014 it was 149 per 1000 live births and in 2015 it was 134 per 1000 live births. However, in 2016 the AKI increased again to 167 per 1000 live births. This was a challenge for the Government of Aceh to further increase regional commitment in providing health services for pregnant women, maternity and postpartum mothers.⁴

In an effort to reduce the AKI, the recording and reporting system is a very important component. Local Area Monitoring (PWS) of AKI is a management tool that consists of several indicators to monitor the MCH Program in a work area continuously so that it can be followed up quickly

and accurately [5]. The results of monitoring and evaluation are very important for decision making at a higher level thus it can have an impact on public health status.⁶

The AKI in Aceh is indeed above the national average, but to reach the SDGs target is still far away. To see what factors influence the maternal mortality rate, one can analyze the KIA program coverage data through the PWS KIA records and reports. There are no studies that use PWS KIA records and reports in Aceh to analyze the relationship with maternal mortality, thus the writer wants to analyze maternal mortality rates in Aceh through the coverage of the KIA program with PWS KIA Aceh data from 2015 to 2017.

Material and methods

This research design uses ecological studies or population correlation studies. The study was conducted in the Aceh region using KIA Program Coverage data derived from PWS KIA data at the Aceh Health Office in the Public Health Division of Family Nutrition Health which is a collection of data from the Health Office of 23 Regencies / Cities. The population and sample of this study were PWS KIA data from 23 districts / cities in Aceh from 2015 to 2017. The study was conducted from April 10 to August 25, 2017.

Demographic data distribution will be processed by descriptive univariate analysis and presented in n or%. Presentation of data for descriptive and analytical results is made in the form of text, tables, and images as needed.

Bivariate analysis was performed with simple linear correlation and regression. Correlative bivariate analysis was performed to see the relationship between independent and dependent variables with Pearson correlation analysis with the output of p-value and correlation coefficient. Pearson correlation analysis was chosen because the hypothesis in this study is a correlative hypothesis with the dependent and independent variables in the form of numerical variables. Variables were also analyzed in simple linear regression to determine the linear relationship between one independent variable with another dependent variable to determine whether positive or negative to predict the value of the independent variable has increased or decreased.

Multivariate analysis was carried out to see the relationship between all the independent variables to find out which variable was most influential on the dependent variable. Multivariate analysis was performed with multiple linear regression tests to find a linear relationship between two or more independent variables with the dependent variable. This analysis is useful to determine the direction of the relationship between independent variables with the dependent variable whether each is positively or negatively related to predict the value of the

variable experiencing an increase or decline. Data commonly used is interval or ratio scale.

Results

Indicators of KIA program coverage include antenatal services as well as childbirth and childbirth services. Antenatal services include K1 Visit, K4 Visit, Provision of Fe1, Provision of Fe3, detection of Risk by Health Workers and Risk Detection by Community. The coverage of childbirth and childbirth services includes Childbirth by Health Workers, Childbirth by Health Workers in Health Facilities, Childbirth by Health Workers not in Health Facilities, Maternal Complications Treated, KF1, KF2 and KF3.

Table I shows that North Aceh District is the district with the highest number of deaths in 2015 to 2017 with a total of 59 maternal deaths, where in 2015 there were 15 women died, in 2016 there were 26 women died and in 2018 there were 18 deaths.

Table II shows that in general the coverage of the MCH program from 2015 to 2017 increased although not very significant, generally increasing from 1% to 3%. Coverage of K1 in 2015 to 2016 did not increase 87%, in 2017 it increased to 89%. While K4 coverage for 2015 reached 79%, in 2016 it dropped to 78% while in 2017 it increased to 80%. Likewise with the coverage of Fe1 in 2015 the coverage was 84%, in 2016 it rose 86% and 2017 rose 87%. For Fe3 Coverage in 2015 and 2016 it was only 77% and in 2017 it rose slightly 78%. Another case with the coverage of risk detection by health workers in 2015 reached 15%, in 2016 rose 17% and in 2017 reached 18%. While risk detection by the public from 2015 to 2017 remained at 2%. Coverage of births by health workers from 2015 to 2017 ranged from 82-83%. Births by health workers in health facilities from 2015 reached 76%, in 2016 it rose to 79% but in 2017 it dropped to 75%. Another case with deliveries by health workers in non-health facilities in contrast in 2015 reached 5%, in 2016 it fell to 3% but in 2017 it rose to 8%. Maternal complications handled rose from 2015 to 2017 including 18% rose to 63% and 76%. As for the coverage of KF1 and KF2 from 2015 to 2016 the coverage rate was between 80% - 83%.

Table I. distribution of mothers' mortality in district / city in aceh in 2015 up to 2017

No	Kabupaten	Jumlah Kematian Ibu			
		2015	2016	2017	Total 2015 s/d 2017
	AKI Aceh	135	169	149	453
1	Simeulue	8	5	7	20
2	Aceh Singkil	6	8	11	25
3	Aceh Selatan	2	5	6	13
4	Aceh Tenggara	1	8	1	10
5	Aceh Timur	14	21	20	55
6	Aceh Tengah	7	5	3	15
7	Aceh Barat	3	6	9	18

affect the number of maternal deaths by 29.5% while the rest is influenced by other factors.

p value between Fe1 and Fe3 against the number of maternal deaths had a significant relationship p value of Fe1 of 0.010 and Fe3 of 0.0002. Fe1 Pearson correlation value -0.310 showed a negative correlation with sufficient strength. Fe3 Pearson correlation value -0.442 showed a negative correlation with sufficient strength. R-Squared obtained 0.233 so it is concluded that Fe1 and Fe3 affect the number of maternal deaths by 23.3% and the rest is influenced by other factors.

p value between risk detection by health workers and risk detection by the community against the number of maternal deaths did not have a significant relationship p value of risk detection by health workers by 0.088 and risk detection by the public by 0.107. Risk detection by health workers Pearson correlation value -0.27 showed a negative correlation with sufficient strength, community risk detection Pearson correlation value of 0.195 indicated a positive correlation with very weak strength. R-Squared obtained 0.065 therefore it is concluded that the detection of risk by health workers and the detection of risk by the community affected the number of maternal deaths by 6.9%, the rest is influenced by other factors.

p value between K1 and K4 against the number of maternal deaths had a significant relationship p value of K1 0.01 and K4 0,0001. K1 Pearson correlation value -0.308 showed a negative correlation with sufficient strength. K4 Pearson correlation value -0.451 shows a negative correlation with sufficient strength. R-Squared obtained 0.295 thus it is concluded that K1 and K4

p-value of labor by 0.049 means that there was a significant relationship to the number of maternal deaths. Correlation rate for labor by the Pearson value of -0.028 showed a negative correlation with sufficient strength. R-Squared obtained 0.056 thus it is concluded that labor by nurses affected the number of maternal deaths by 5.6% while the rest is influenced by other factors.

Table II. distribution of average coverage of kia program in aceh, 2015 up to 2017

No	Kegiatan KIA	Cakupan Aceh (%)			
		2015	2016	2017	Rata-Rata 2015 s/d 2017
1	Pemeriksaan K1	87	87	89	88
2	Pemeriksaan K4	79	78	80	79
3	Pemberian Fe1	84	86	87	86
4	Pemberian Fe3	77	77	78	77
5	Deteksi Resiko Nakes	15	17	18	17
6	Deteksi Resiko Masyarakat	2	2	2	2
7	Persalinan oleh Tenaga Kesehatan	82	82	83	82
8	Persalinan oleh Tenaga Kesehatan di Faskes	76	79	75	77
9	Persalinan oleh Tenaga Kesehatan di Non Faskes	5	3	8	5
10	Komplikasi Maternal yang ditangani	18	63	76	53
11	Pemeriksaan KF1	81	81	83	82
12	Pemeriksaan KF2	81	80	82	81
13	Pemeriksaan KF3	78	78	81	79

p value of delivery by health workers in the health facilities and non-health facilities had no relationship with the number of maternal deaths due to the p value of 0.923 and 0.263, respectively. The correlation rate of delivery by health workers in the health facilities and non-health facilities, the correlation values of -0.149 and -0.137, respectively, showed a negative correlation with very weak strengths. R-Squared obtained 0.074 thus it is concluded that labor by health workers in the health facilities and delivery by health workers in non-health facilities affect the number of maternal deaths by 7.4%, the rest is influenced by other factors.

p value between the number of maternal deaths and maternal complications handled was 0.195, > 0.05, this means that it did not have a significant relationship. Correlation value of 0.158 which means that showed a positive relationship with a very weak correlation. R-Squared obtained 0.025 thus it is concluded that maternal complications handled influenced the number of maternal deaths by 2.5% while the rest is influenced by other factors.

p value of KF1 was 0.044 and KF2 is 0.032, which means that it had a significant relationship, while the KF3 of 0.686 was not significant. Pearson KF1 correlation value was -0.243 indicating a negative correlation with strength was very weak, KF2 of -0.258 showed a negative correlation also with strength was very weak, and so for KF3 the correlation was -0.221. R-Squared obtained 0.069 thus it was concluded that the risk detection by health workers and the detection of risk by the community affected the number of maternal deaths by 6.9%, the rest is influenced by other factors.

Variables K1, K4, Fe1, Fe3, Labor by health worker, KF1 and KF2 were included in the

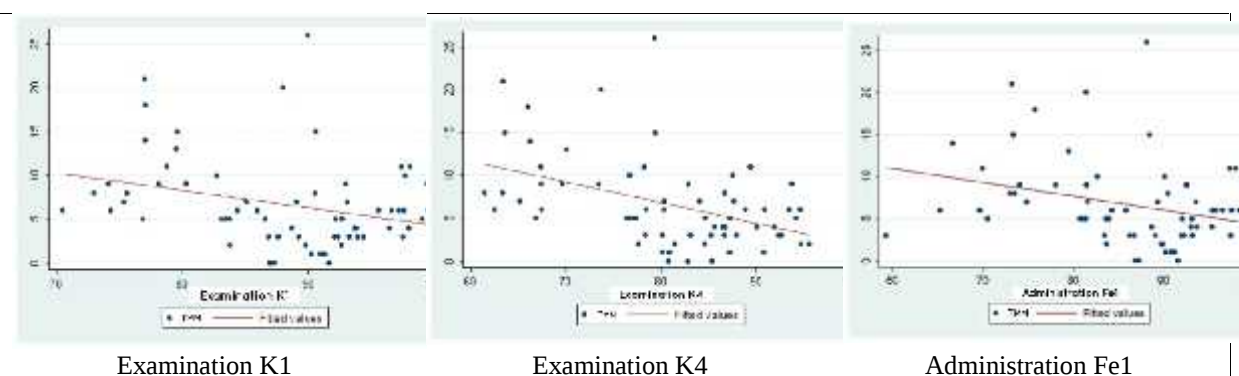
multivariate analysis because they gave significant results in the bivariate correlation test. Based on linear regression test results only K4 variable p value = 0.07 which shows significant results and obtained R Square value of 0.355 so it is concluded that K4 affects the number of maternal deaths by 35.5%, the rest of 64.5% is influenced by other things.

Discussion

If we look at district / city KI and K4 coverage rates there were some high numbers of K1 and K4 visit coverage but maternal mortality was also high. This was found in North Aceh and Bireun. This could have happened because the recording and reporting were already good therefore every maternal death was recorded and reported. The area with the lowest number of maternal deaths was Gayo Lues Regency. The low maternal mortality in this area could have been due to maternal deaths that were not reported either to the District Health Office and the Aceh Health Service.

This study is in line with the epidemiological-based scientific review made by Carroli et al (2001) which stated that antenatal care influence the number of maternal deaths and disabilities. In the study it was mentioned that the more pregnant women undergoing antenatal care examinations, the lower the mortality and disability of pregnant women will be.⁷

Simkhada et al (2008) made a review of research sourced from 28 studies from 1990 to 2006 and found that the most influential factors on antenatal care are a mother's education level, husband's education level, marital status, finance, family income, a mother's work and history of complications during pregnancy and childbirth.⁸



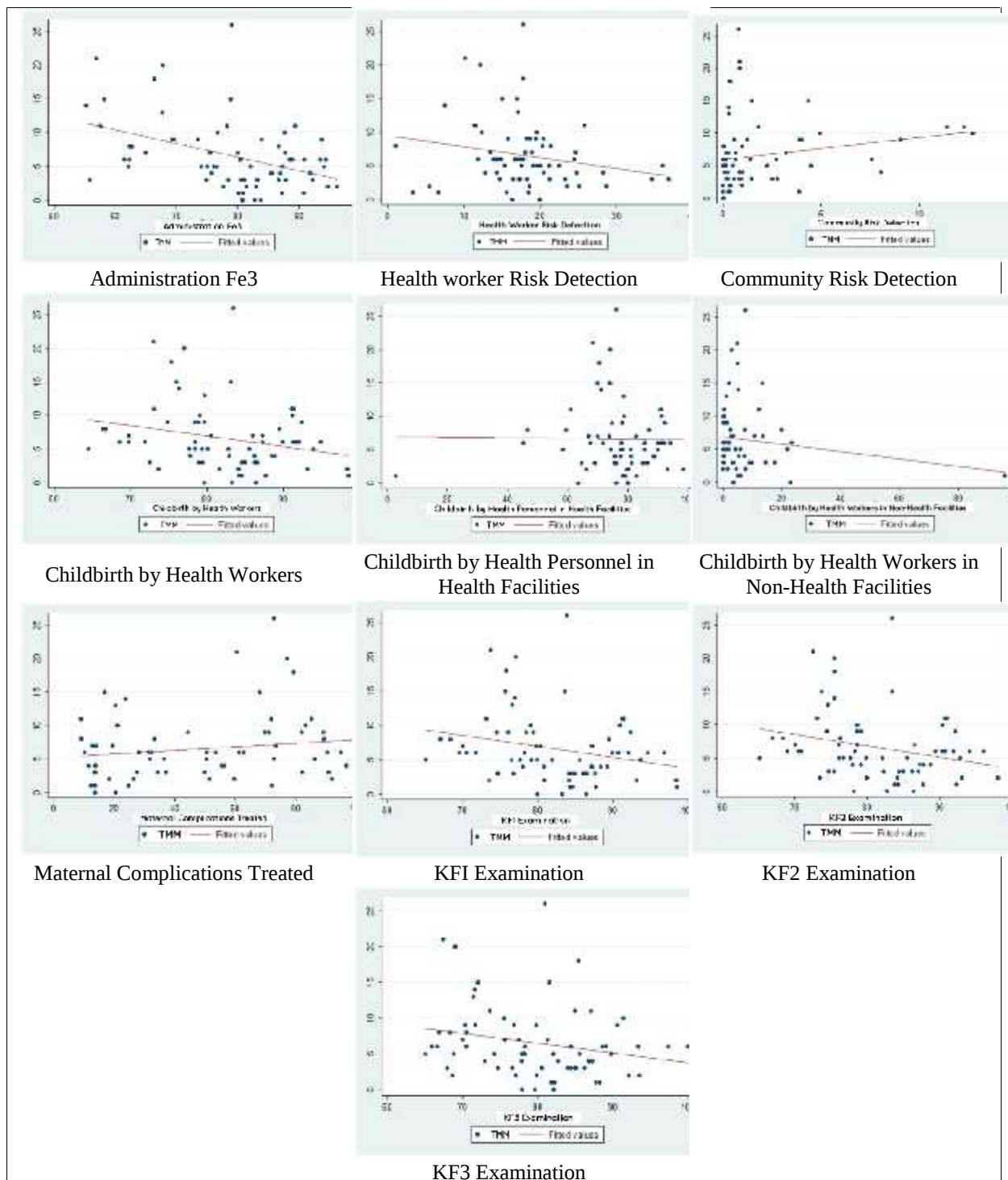


Fig.1 A plot graph of the relationship between the coverage of KIA program in Aceh from 2015 to 2017 to the number of maternal deaths

The average coverage of the provision of Fe1 in Aceh from 2015 to 2017 was between 84% to 87%. The lowest annual coverage were Simeulue and Singkil while the highest coverage were in Bireuen and Langsa. This is in line with Silvy's (2016) research on the coverage of ANC with the coverage of Fe tablets in relation to the prevalence of anemia in East Java with the result that there was no relationship between the coverage of ANC and Fe

tablets with the prevalence of anemia because it affected the anemia of pregnant women including many factors such as bioavailability of iron and compliance of pregnant women consuming iron.

In connection with this study using secondary data, the researcher could not find out from the iron tablets they obtained from health workers how much they consumed, because Fe tablets could have been distributed but not consumed by pregnant women.

The results of the study on the relationship between the scope of risk detection by health workers and

the detection of risk by the community towards the number of maternal deaths in Aceh from 2015 to 2017 showed a significant relationship. This contrasts with the results of a study by Macleod et al. (1998) which in his study stated that risk detection had a relationship to AKI in Tanzania, a country in the East African region. In the study it stated that several aspects of early detection can affect maternal mortality rates including antenatal visits, emergency management of complications that occur, the availability of transportation in an area and the level of education of health workers who handle a case [9].

Coverage of deliveries by health workers from 2015 to 2017 was the highest in Banda Aceh and lowest in Simeulue. This could happen in Simeulue, possibly because people believe more in giving birth with the help of non-health workers such as shamans because shamans were usually closer to the community, considered to be more experienced than health workers who are young and less experienced. The other thing that affected not giving birth with the help of health workers was because the distance between health facilities / home health was far that when mothers was going to give birth they did not have enough time to reach the place of health care so they give birth to close maternity assistance such as village shamans.

Karlsen et al (2011) in their study stated that the high maternal mortality rate is related to the location of the delivery place. Saffron stated that the maternal mortality rate is higher if a mother gives birth at a non-health care center, one of the things that influences a mother in choosing a birth location is the level of education of a mother. The lower the education level of a mother will tend to give birth instead of at the health service center and further increases the risk of high maternal mortality.

The low coverage of maternal complications is influenced by the lack of understanding of SOPs by health workers who assist particular childbirth on this matter, even though they have exercised this right as detected by postpartum sick women such as maternal blood pressure rising then given action, but they do not know that it is part of handling maternal complications¹⁰ Lewis (2003) in his research stated that every year around the world there are eight million pregnant women who are at risk and more than one and a half million die from death. In several developing countries, one in 11 mothers who experience complications during pregnancy will experience death.¹¹

The lowest KF1 visit coverage in 2017 is Simeulue, which is likely to be low coverage related to birth attendants by non-medical / traditional healers. Another thing that affects childbirth coverage is that labor in a different place such as a young mother giving birth at her parents' home and after giving birth back to her own home with a different location that health workers who assist in childbirth cannot make childbirth visits to the mother.

This study is in line with research conducted by Ronsmans et al (2006) which stated that postpartum control affects the maternal mortality rate. In the study it is stated that in addition to control after childbirth, the amount of how often a mother in exercising control after giving birth is also closely related to the maternal mortality rate. A mother who controls postpartum more often will have a lower risk of maternal mortality compared to a mother who only controls a few times after giving birth. In addition, a mother who controls after giving birth also has a lower risk of death compared to a mother who never controls postpartum at all.¹²

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