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IRON TABLETS DISTRIBUTION OF PREGNANT WOMAN IN THE DISTRICT AND CITY OF EAST JAVA PROVINCE

Soenarnatalina Melaniani, Department of Biostatistics and Population Study, Faculty of Public Health Airlangga University, Jl. Airlanga 4-6 Surabaya 60115, e-mail: natalina.fkmua@gmail.com

INTRODUCTION

According to WHO (2008), Maternal Mortality Rate (MMR) is one success indicator of health services in a country. Maternal death can occur due to several reasons, such as anemia. Iron deficiency is a major cause of anemia in pregnant women compared with a deficiency of other nutrients. Anemia is a health problem experienced by women around the world, especially in developing countries.

World Health Organization (WHO) reported that the prevalence of pregnant women who have iron deficiency is around 35-75% and thus increase in accordance of the gestation. According to the WHO, 40% of maternal deaths in developing countries are associated with anemia in pregnancy and most of anemia in pregnancy is caused by iron deficiency and acute bleeding, or both.

Riskesdas data in 2013 indicate that there are 25.3% of the total number of pregnant women in East Java or around 24 people pregnant women suffer from iron deficiency anemia during pregnancy. The health of pregnant women need to be improved in order to achieve the fifth MDGs, it should be highly considered about the distribution of Fe tablets 30 and tablets 90, as well as the K1 and K4 visit by pregnant women.

Distribution of Fe tablet 30 and tablets 90 in districs and cities need to be compared using the statistic test namely T-test while to find the effect of tablet Fe 30 tablets in the K1 pregnancy visit and the effect of tablet Fe 90 tablets in K4 pregnancy visit by using regression.

Research purposes :

1. To analyze the differences between distribution of Fe tablets 30 and Fe tablets 90 ini districs and cities.
2. To analyze the effect of Fe tablets 30 in K1 pregnancy visit and the effect of the Fe tablets 90 in K4 pregnancy visit, also its effectiveness in East Java Province.

Benefits of the research :

Improve maternal health with the equality on the distribution of Fe tablets 30 and Fe tablets 90 in each districs and cities.

METHODS

This is non reactive study or unobstrosive method, a study that does not respondents or participants or respondents did not participate actively, but only by analyzing secondary data taken from the Health Profile of East Java Province, 2014. Secondary data that was used was the precentage of Fe tablets 30 and tablets 90 distribution as well as the K1 and K4 pregnancy visit based on districs/cities which was consisted of 29 districs and 9 cities in East Java Province in the 2014.

The analization of difference in Fe tablets distribution between districs and cities using T-test with 2 samples, whereas the purpose was to analize the effect to Fe tablets 30 distribution in K1 pregnancy visit and Fe tablets 90 in K4 pregnancy visit using linear regression.

Johnson and Bhattacharryya (1993) states that the two independent samples of t-test is a method used to test the similarity of the average between two independent populations, which the researchers did not have information about the variation of the populations. Independent means the one population was not influenced or not associated with other populations.

Student's t-test

Student's t-test was used if they meet the requirements which were the data were normally distributed, two independent groups/samples and the amount of data is less than 30. The hypothesis test using student's t-tes need attention to a point that was whether the variance of the population (not the sample variance) is assumed homogeneous (same) or not. When the population variances are assumed equal, the Student's t-test that used was Student's t-test assuming homogem variance, whereas if the population variances of the two samples are not assumed to be homogeneous, thus the test used student's t-test assuming heterogeneous variance. Student's t-test with a variety of homogeneous and heterogeneous has different formula, if student's t-test was used in order to test hypotheses in two samples, thus the tests must be conducted on the assumption of homogeneity of the population variance in

advance, whether the population is taken homogeneous or heterogeneous

Regression

Regression analysis is one statistical data analysis techniques that are often used to examine the relationship between several variables and predict a variable (Kutner, Nachtsheim and Neter, 2004). According Drapper and Smith (1992) regression analysis is an analytical method that can be used to analyze data and take significant conclusions about the relationship of dependence variable to another variable. When the analysis involves only an independent variable, the analysis used is simple linear regression analysis.

Methods that can be used to estimate parameters of the simple linear regression model is the least squares method (ordinary least square/OLS) and maximum likelihood method (MLE) (Kutner et.al, 2004).

Simple Regression Model

The way to analyze simple regression :

a. Types of Regression Models
b. Determining the Simple Linear Regression Equation
c. Measures of Variation in Regression and Correlation
d. Assumptions of Regression and Correlation
e. Residual Analysis and the Durbin-Watson Statistic
f. Estimation of Predicted Values
g. Correlation - Measuring the Strength of the Association

Linear Regression Assumptions For Linear Models are:

1. Normality
a. Y Values Are Normally Distributed For Each X
b. Probability Distribution of Error is Normal
2. Homoscedasticity (Constant Variance)
3. $Y_i = b_0 + b_1 X_i + e_i$ Independence of Errors

The general form of multiple linear regression statistics can be expressed as follows:

Whereas :

Y_i is Dependent (Response) Variable
β_0 is intercept
β_1 is slope
X_i is Independent (Explanatory) Variable
ε_i is Random Error

Assumptions must be met at Random Error (εi) is:

1. Identical
2. Independent
3. The standard normal distribution

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RESULT AND DISCUSSION

The distribution of Fe tablets 30 is showed as follows :

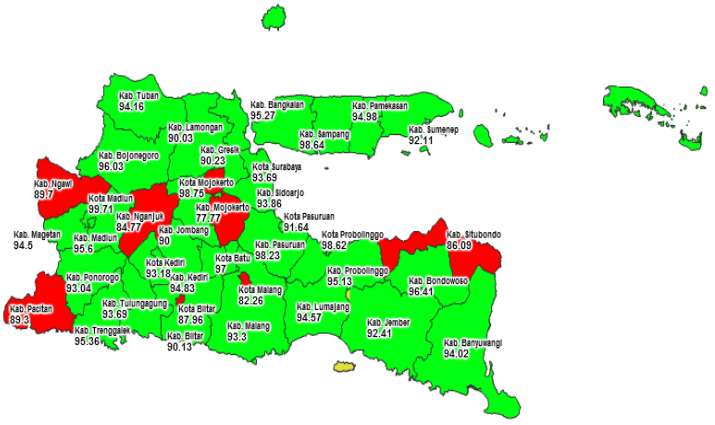

Figure 1. Distribution Award Fe 30 tablets in pregnant women in the province of East Java

Figure 1 shows that almost all the area of green met the national target (90%), while there are five districts in red (below the national target) which are Ngawi (89.70%), Pacitan (89.30%), Situbondo (86.09%), Nganjuk (84.77%), Mojokerta (77.77%)

and 2 towns, namely Blitar (87.96%) and Malang (82.26%).

Distribution of Fe tablets 90 is showed as follows :

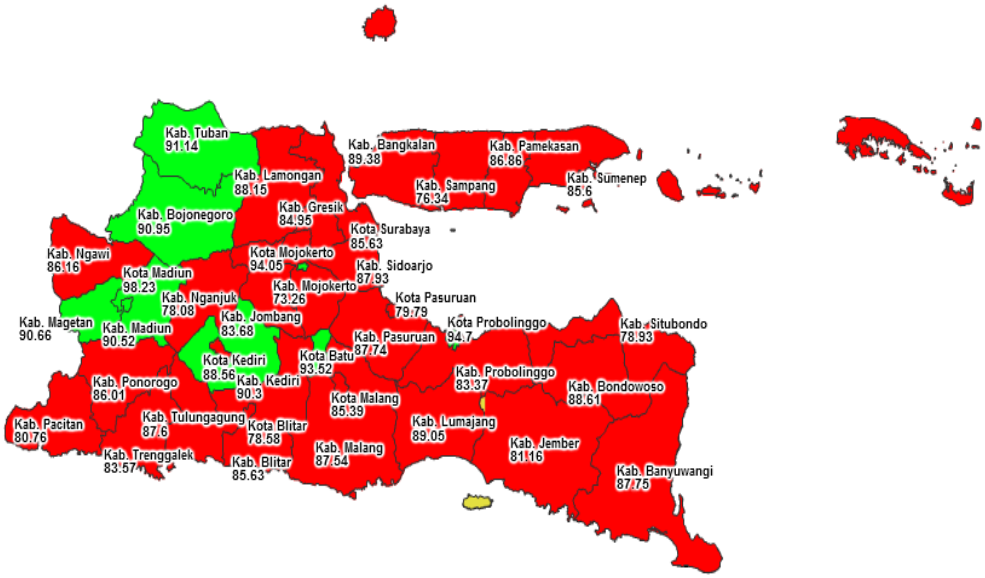

Figure 2. Distribution of Fe tablets 90 in pregnant women of East Java Province

Figure 2 shows that almost all the area (90%) is still red (under the national target), there are only five districts in green (above the national target): Kediri (90.30%), Madiun (90.52%), Magetan (90.66 %), Bojonegoro (90.95%), Tuban (91.14%) and there are four towns, namely: Batu (93.52%), Mojokerto (94.05%), Probolinggo (94.70%), Madiun (98.23%).

The results of the analysis of which is showed as follows:

Table 1. Result of descriptive statistic of Fe distribution in pregnant women

Area	Variable	Mean	Median	Mode	SD	Minimum	Maximum
Districs	Fe 30	92.56	93.86	77.77	4.30	77.77	98.64
	Fe 90	85.86	86.86	73.26	4.60	73.26	91.14
	K1	95.41	95.61	88.53	3.45	88.53	100.65
	K4	87.38	87.81	75.44	5.21	75.44	97.09
	Number of pregnant woman	20279.62	1933.00	8230.00	9227.38	8230.00	45115
Cities	Fe 30	93.64	93.69	82.26	5.76	82.26	99.71
	Fe 90	88.72	88.56	78.58	6.90	78.58	98.23
	K1	96.18	97.71	87.96	4.18	87.96	100.81
	K4	91.31	93.52	78.58	6.47	78.58	98.23
	Number of pregnant woman	9742.11	3881.00	2299.00	14726.84	2299.00	47567.00

Table 1 shows that the distribution of Fe tablets 30 in District is in average of 92.56 with a 4.30 standard deviation, while the distribution of Fe tablets 90 in distics is in average of 85.86 with a 4.30 standard. The distribution of Fe tablets 30 is 93.64 with 5.67 standard deviation, while the distribution of Fe tablets 90 is 88.72 with a 6.90 standard deviation.

The test results for normality using the Kolmogorov-Smirnov test showed that the distribution of Fe tablets 30 (p = 0.35), Fe tablets 90 (p = 0.70), K1 visits (p = 0.85) and K4 visits (p =

0.99) the result all showed number greater α = 0.05, then the Fe tablets 30 and tablets 90 distribution, K1 and k4 visit can be continued using parametric statistics. Homogeneity of variance test results show that both the distribution of Fe tablets 30 has p = 0305 and Fe tablets 90 has p = 0066 where p> α = 0.05, then variance of Fe distribution showed homogeneous variant.

The student's t-test result showed that there was no difference from Fe distribution in both districs and cities. The result showed the distribution of Fe 30 tablets (p = 0.545) and the distribution of Fe tablets 90 (p = 0.122). In general the distribution of Fe tablets 30 and tablets 90 has higher number in cities even though the higher number of pregnant woman were found in districs. The number of K1 and K4 pregnancy visits also showed higher number in cities compared to result found in districs.

The analysis result of correlation and regression between the distribution of Fe tablets 30 to K1 pregnancy visit and distribution of Fe tablets 90 in K4 pregnancy visit is showed as follows:

Correlation between the distribution of Fe tablets 30 to K1 pregnancy visits shows that there is a correlation with p = 0.000. Correlation between the distribution of Fe tablets 90 with K4 pregnancy visit indicates that there is a correlation with p = 0.000, thus both is tested using regression test.

Table 2 Results of ANOVA Test from distribution of Fe tablets 30 in K1 visits ad distribution of Fe tablets 90 in K4 visits

Variable	Model	Sum of Squares	df	Mean Square	F	Sig.
Fe 30	Regression	200.378	1	200.378	26.012	0.000
	Residual	277.322	36	7.703		
	Total	477.699	37			
Fe 90	Regression	297102.276	1	297102.276	22921.574	0.000
	Residual	497.582	37	12.962		
	Total	297581.860	38			

Table 2 shows that there is the effect of Fe tablets 30 distribution to visit K1 (p = 0.000) and also to the K4 visits (p = 0.000).

Model of the distribution of Fe tablet 30 to K1 visit is : K1 visit = 48.91 + 0.503 * Distribution of Fe 30

The coefficient of determination (R^2) was 64.8% means the distribution of Fe tablets 30 will support the model of K1 visits as many as 64.8%.

Model of the distribution of Fe tablet 90 to K4 visit is : K4 visits = 1022 * distribution of Fe 90

The coefficient of determination (R^2) was 99.9% Fe means the distribution of Fe tablets 90 will support the model of K4 visits as many as 99.9%.

If the distribution of Fe 30 and Fe 90 tablets is 90%, then the K1 visits is 94.8% while the K4 visits is 91.98%. Thus, it can be concluded that the distribution of Fe tablets 30 in K1 visit is more effective.

CONCLUSION

1. The distribution of Fe tablets 30 and tablets 90 has higher number in cities even though the higher number of pregnant woman were found in districs. Statistically, the distribution of Fe tablets 30 and tablets 90 is similar in districs or cities.
2. Distribution of Fe tablets 30 has influence on the K1 visits and distribution of Fe tablets 90 has an influence on K4 visits, but the distribution of Fe tablets 30 in K1 visit is has more effective result.

REFERENCE :

1. Badan Litbang Kesehatan. Laporan RISKESDAS Tahun 2013. Jakarta : Badan Litbang Kesehatan, Dep Kes RI, 2013.
2. Dinas Kesehatan Provinsi Jawa Timur. 2015. Profil Kesehatan Provinsi Jawa Timur 2014.
3. Draper,N.and H.Smith, Applied Regression Analysis, John Wiley & Sons, Inc., New York, 1985.
4. Johnson, R.A. and G.K. Bhattacharryya, Statistical Concepts and Methods, John Wiley, New York, 1993.
5. Kutner, M.H., C.J. Nachtsheim., dan J. Neter. 2004. *Applied LinearRegression Models*. 4th ed. New York: McGraw-Hill Companies, Inc.
6. WHO. 2008. Worldwide prevalence of anemia 1993- 2005 WHO Global Database On Anemia. Spain : World Health Organization