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Can Tripicon-S Technology Be A Smart Option for Water Treatment?

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Abstract

River water pollution is caused by many people defecating in the river. Access to sanitation in Barito Kuala Regency is 44.30%. To control pollution in river water while overcoming the sanitation of seaside communities that have narrow land and swamp areas, the appropriate technology built is Tripikon-S. This study aims to determine the effectiveness of Tripikon-S technology on water quality based on physical, chemical and biological parameters in terms of time of use in Baliuk Village, Marabahan Regency, Barito Kuala Regency. The research method of this study is quasi-experimental by conducting laboratory tests through inlet and outlet water pipe test samples at tripikon-S facilities at different times (time series study). The sample in this study is wastewater in the inlet and outlet of the Tripikon-S facility. Statistical data analysis was tested for normality and homogeneity using the Paired T test (pH, BOD, COD). If the data is not normally distributed, an alternative wilcoxon test (temperature, ammonia) is used. Whereas for E. coli using the category fulfills the requirements and does not qualify with the chi-square test. The results showed that there was a difference between inlet and outlet for temperature variables ($p = 0.004$), BOD ($p = 0.001$) and E. coli ($p = 0.034$). The results showed that there was no difference between the inlet and outlet in the pH variables ($p = 0.908$), COD ($p = 0.581$) and Ammonia ($p = 0.776$).

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Keywords: Tripikon-S, physics, chemistry, biology

1. Introduction

Most of the river water pollution in Barito Kuala Regency is caused by people who defecate carelessly on the barito river coast. Based on smart STBM data From the 13 districts / cities in the province of South Kalimantan, the lowest access to sanitation was in Barito Kuala District, which was 44.30%. This can not be separated from the condition of Barito Kuala Regency, which is almost 90% in the form of water, so that the domestic waste produced is disposed of into the river. even though river water is still a source of life for the local community. River water pollution can result in various diseases such as diarrhea (Widyastutik, .O (2016)

To control pollution of river water while at the same time overcoming sanitation of waterfront communities that have narrow land and swamp water areas, appropriate technology is built called Tripikon-S. With the Tripikon-S technology whose tubular design functions as a septic tank, it is expected that river water pollution can be handled (Djonoputro, 2010).

This research needs to be done to determine the effectiveness of Tripikon-S technology on water quality based on physical, chemical and biological parameters in terms of the time of use.

2. Methods

This study used 1 (one) Tripikon-S facility that was installed in a community toilet in the village of Baliuk, RT 3, Marabahan District. The liquid waste that enters through the closet is taken as an inlet sample and the waste coming out of the tripikon-S tool is taken as an outlet sample. Each inlet and outlet wastewater sample was taken using a bottle of 150 ml. Sampling was carried out for 16 weeks simultaneously at the inlet and outlet on one tripikon-s facility at 6:00 a.m. Testing of inlet and outlet waste samples was carried out at the Biokomia Laboratory, Faculty of Medicine, Lambung Mangkurat University, Banjarbaru. The temperature parameters on the tool were carried out at the location, while the parameters examined in the laboratory were pH, BOD, COD, Ammonia and E. Coli.

Univariate analysis was performed on each variable from laboratory test results from two test sample stations in one Tripikon-S at different times. Whereas bivariate analysis was conducted to see the difference between independent variables and dependent variables based on laboratory test results from two test sample stations in one Tripikon-S at different times. So it is known the effect of each variable studied on the time of use of Tripikon-S facilities. 2.4. This research has gone through the feasibility of ethical testing with No. 633 / KEPK-FK UNLAM / EC / IV / 2018. All data were tested for normality and homogeneity, each group saw differences in inlet and outlet using paired T-tests (pH, BOD, COD). If the data is not normally distributed, an alternative to the Wilcoxon test (temperature, ammonia) is used. Whereas for E. coli using the category fulfills the requirements and does not qualify with the chi-square test.

3. Results

a. Differences in Inlet and Outlet Based on temperature variables(°C)

Analysis results and different test statistics Paired t-test between inlet and outlet based on temperature variables obtained the value of Sig (2 tailed) is 0.004 which means that <0.05 (H_0 is rejected). This shows that there is a difference between the value of inlet and outlet based on temperature variables.

b. Differences in Inlet and Outlet Based on pH variables

The results of the analysis and statistics of the different tests Paired t-test between inlet and outlet based on the pH variable found that the Sig (2 tailed) value was 0.908, which means that >0.05 (H_0 was accepted). This shows that there is no difference between the inlet and outlet values based on the pH variable.

c. Differences in Inlet and Outlet Based on BOD variable (mg / L)

Analysis results and different test statistics Paired t-test between inlet and outlet based on BOD variable obtained the Sig (2 tailed) value of 0,000 (it can be said the sig value is 0.001 because in spss there is no value of 0) which means that $<0, 05$ (H_0 rejected). This shows that there is a difference between the inlet and outlet values based on the BOD variable.

d. Differences in Inlet and Outlet Based on Variable COD (mg / L)

The results of analysis and statistics of different tests Paired t-test between the inlet and outlet based on the COD variable, the Sig (2 Tailed) value is 0.581 which means that >0.05 (H_0 is accepted). This shows that there is no difference between the inlet and outlet values based on the COD variable.

e. Differences in Inlet and Outlet Based on Ammonia Variables (mg / L)

The results of the analysis and Wilcoxon test statistics between the inlet and outlet based on the Ammonia variable obtained the values of Z and Asymp Sig. Z count is -0.284b and asymp the Sig is 0.776 which means that >0.05 . This shows that there is no difference between the inlet and outlet values based on the Ammonia variable.

f. Differences in Inlet and Outlet Based on E. Coli Variables

The analysis results and Wilcoxon test statistics between the inlet and outlet based on the E. Coli variable obtained the value of Z and the Sig asymp value was -2.675b and the 2-tailed asymp value was 0.034 which means <0.05 (H_0 rejected). This shows that there is a difference between the inlet and outlet values based on the E. Coli variable.

4. Discussion

a. Differences in Inlet and Outlet Based on temperature variables($^{\circ}$ C)

In this study a significant value was obtained. This shows that there is a difference between the value of inlet and outlet based on temperature variables. where the temperature at the outlet shows a decrease compared to the temperature in the inlet on the tripikon-S device. The temperature decrease in the tripikon-S device occurs due to the decomposition process by aerobes and anaerobes. The decrease in temperature is also influenced by changes in the season. This can be seen in figure graph 4.1 (page 38) where the temperature fluctuates from week 1 to week 16, but there is a drastic increase at week 9 and week 16 (26° C) at the inlet. This was influenced by the rainy weather during sampling in the 9th and 16th weeks. In addition, it is also influenced by the amount of oxygen available in the aerobic process which supports the fermentation process by bacteria (Boyd, 2015).

The results of this study are in accordance with the research of Selintung, M (2011) which states that there is a decrease in temperature between the inlet and outlet of the tripikon-S as a result of an aerobic and anaerobic decomposition process.

b. Differences in Inlet and Outlet Based on pH variables

In this study there were no meaningful values. This shows that there is no difference between the inlet and outlet values based on the pH variable. This happens due to the reaction produced from fermentation in the

anaerobic process which greatly affects the pH value. Water pH is also influenced by high levels of ammonia (NH₃) from domestic waste that enters the tripikon-S pipe, so it requires heterotrophic bacteria to decompose ammonia into nitrite and nitrate which will then be converted into nitrogen in the form of gas (Marliana. E and Rakhmawati , 2016) This study is in agreement with Noor's (2011) study which states that tripikon-S has not been effective enough in decreasing water pH as a result of the process of chemosynthesis and high NH₃ in wastewater in the tripikon-S. However, the inlet and outlet values produced from tripikon-S devices are still within the expected limits of 6-9. Whereas according to Selintung and Malamassam (2011) states that tripikon-S is quite effective in decreasing water pH even though it is in a small number range from 6.5 to 6.2.

c. Differences in Inlet and Outlet Based on BOD variable (mg / L)

In this study a significant value was obtained. This shows that there is a difference between the inlet and outlet values based on the BOD variable. where the BOD at the outlet shows a decrease compared to the BOD in the inlet on the tripikon-S tool. Decreasing BOD in tripikon-S devices occurs due to the aerobic decomposition process. This is influenced by the large amount of mineral water entering into a device that contains a lot of oxygen compared to pathogenic bacteria originating from human feces. Whereas decomposition bacteria require a lot of carbon dioxide for the biological process which results in the inhibition of the decomposition process, in addition to the residence time of the tool which affects the BOD value in the inlet and outlet. This study is in accordance with the research of Selintung and Malamassam (2011) which states that there is a decrease in BOD between the inlet and outlet on the tripikon-S which is influenced by the amount of oxygen available to decompose all organic substances that are dissolved. This research is also in accordance with Rai's research. B (2013) which examined the decrease in BOD value in river water as a result of the natural decomposition process in water. However, this research does not correspond with Noor's (2011) research which states that the tripikon-S is not effective enough in reducing BOD to the permissible limits

d. Differences in Inlet and Outlet Based on Variable COD (mg / L)

In this study there were no significant values. This shows that there is no difference between the inlet and outlet values based on the COD variable. This happens due to the aerobic and anaerobic processes that occur in the tripikon-S device. The aerobic process produces carbon dioxide, nitrate, sulfate and organic compounds, while the anaerobic process that occurs produces CH₄, CO₂, and NH₃. The amount of oxygen needed by aerobic microbes to oxidize organic matter into carbon dioxide and water, in addition to organic matter that is difficult to decompose (complex inorganic compounds) looks more than organic matter that is easily broken down. This study is in accordance with the study of Noor (2011) which states that tripikon-S has not been effective enough in decreasing river water COD.

e. Differences in Inlet and Outlet Based on Ammonia Variables (mg / L)

4.5 In this study there were no significant values. This shows that there is no difference between the inlet and outlet values based on the Ammonia variable. This happened because according to Pescod (1973) in Marliana. E and Rakhmawati (2016). ammonia in the waters is an indication of the decomposition of organic matter, especially protein. On chart 4.5 (page 46) it can be seen that the outlet value at weeks 3,4,7,8,9 and 10 is greater than the inlet value. This happens because of the lack of heterotrophic bacteria in the process of decomposing ammonia into nitrites and nitrates, then it will be converted into nitrogen in the form of gases with the help of heterotrophic bacteria and released from water into the air. Heterotrophic bacteria get nutrients from organic materials derived from human feces (Gunadi, et. Al., 2013).

Shrinking water that goes into the tool more than organic material derived from human feces causes a lack of nutrient supply for heterotrophic bacteria. so that it affects the chemical decomposition process and causes the ammonia value to not be much different between the inlet and outlet. It is also influenced by the process of chemosynthesis and high NH₃ in wastewater besides the temperature factor (Hamuna, et.al., 2018).

According to Alabama (2008) in Fathurrahman and Aunurohim (2014) that ammonia in tripikon-S wastewater is largely the product of metabolic processes and aquatic organisms and the process of decomposition of organic matter from human feces, it can also come from river water carrying bacteria from organic waste that is used to drain the remaining defecation in the toilet that goes into the tripikon-S device. This research developed previous research research.

f. Differences in Inlet and Outlet Based on E. Coli Variables

In this study, E. coli values were significant. This shows that there is a difference between the inlet and outlet values based on E. Coli variables. where E. coli numbers at the outlet show a decrease compared to E. coli numbers in the inlet on the tripikon-S tool. E. Coli growth itself is influenced by pH, moisture, light and nutrition. From the results of the research in the 10th week and so on, there was an increase in the E. Coli number at the outlet exceeding the maximum limit of > 240. This was due to the process that occurred in the tripikon-S device not running as expected, where the minimum wastewater stay 3 days before leaving the outlet. However, because of the full volume of tripikon-S, it forces waste water to go out prematurely through outlets (Noor, 2011). So the E.Coli number in waste water at the outlet is still high. This study is in accordance with Selintung's research, M (2011) which concluded that Tripikon-S was able to reduce E. Coli rates by up to 90% through aerobic and anaerobic processes.

5. Conclusion

The results showed that there was a difference between inlet and outlet for temperature variables ($p = 0.004$), BOD ($p = 0.001$) and E. coli ($p = 0.034$). The results showed no difference between the inlet and outlet on the pH ($p = 0.908$), COD ($p = 0.581$) and Ammonia variables ($p = 0.776$).

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Factors Influencing the Participation of National Health Insurance Independently

(Analytic Observational Study on Work Area Sungai Malang Primer Health Care Hulu Sungai Utara Regency)

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Abstract

Health insurance is a guarantee of health protection for everyone, 90% of Indonesians are already JKN participants. The coverage of JKN participation, especially in South Kalimantan is still low, namely 1,323,001 people (34.8%), one of the districts whose membership level is still low, namely Hulu Sungai Utara Regency with 49.65% from 225,822 is not yet a JKN participant especially in the work area of Sungai Malang Primer Health Care where only 12,387 people (25.67%) are JKN participants. Therefore it is necessary to investigate what factors affect the participation of JKN. Explain factors that influence the participation of National Health Insurance independently in the working area of Sungai Malang Primer Health Care. This research type is observational analytic research with design of case control design conducted by work area of Sungai Malang Primer Health Care. The populations were JKN participants and not JKN participants, while sampling using purposive sampling. The research variables are age, education level, knowledge, income, motivation, perception and socialization as independent variable and JKN membership independently as dependent variable. The research instrument used is the stuffing sheet. The result of multiple logistic regression analysis obtained the most influential variable is age (OR=9,8). There is a significant influence, level of education (P-value=0,000), knowledge (0,000), motivation (0,000), perception (0,000) and socialization (0,000).

Keywords: national health insurance, social insurance provider body, participation

Introduction

Health insurance is a guarantee in the form of health protection for the community to benefit health care and protection in fulfilling basic health needs given to every person who has paid the dues or fees paid by the government¹. There is a Social Security System in the amendment of the 1945 Constitution, and the publication of Law No. 40 of 2004 on the National Social Security System (SJSN) that every person has the right to social security to be able to meet the basic needs of a decent life and improve his dignity towards the realization of a prosperous, just and prosperous Indonesian society

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becomes a strong proof that government and related stakeholders have a great commitment to realize social welfare for all its people².

In support of the implementation, Law no. 24 Year 2011 establishes the National Health Insurance (JKN) organized by BPJS, which consists of BPJS Health and BPJS Employment. JKN held by BPJS Kesehatan whose implementation begin on January 1, 2014³. Social Security Administering Body (BPJS) as the implementing agency has done various activities to accelerate JKN roadmap travel process so universal health coverage (UHC) quickly achieved. Socialization in various mass media about the benefits, payment method, the amount of dues chosen according to ability, has been implemented, but the expected result that there will be increasing independent participant not seen real⁴.

Data Ministry of Health RI (2013), shows the number of people who are guaranteed in various forms and health insurance as much as 151.6 million out of a total of 293.7 million people in Indonesia. Thus there are still 142.1 million people in Indonesia who do not have health insurance. Based on data of Social Security Administration Agency (BPJS) Health (2015). South Kalimantan Province of the total population of 3,989,793 people in the JKN membership coverage of 1,323,001 people (34.8%), consisting of 763,063 people (57.67%) of the contribution beneficiaries (PBI) and non PBI 559,938 inhabitants (42.32%)⁵.

Based on data on the coverage of the working area of each Primer Health Care in Hulu Sungai Utara District, the Sungai Malang Health Center has the working area with the largest number of residents from other working areas and has the lowest percentage of JKN participation in Hulu Sungai Utara Regency. The number of JKN

participants at the Sungai Malang Primer Health Care was 12,387 people as of June 2016 with the coverage of the working area 47,961 residents in Amuntai Tengah subdistrict, meaning only 25.67% of the population in the working area of Malang River Community Health Center which is the participant of JKN which means 75,43% of the people in the region have the potential to become the most independent JKN participants.

Material and Method

The research is a kind of quantitative observational analytic research with case control approach. Type research is done by comparing case groups and control groups. The number of samples in this study is determined by purposive sampling method. The number of samples in study as much as respectively 130 respondents, which means the total sample in study was 260 respondents.

Findings

Table 1: Result of Univariate Analysis

No	Variable	Category	Frequency	%
1	Age	18-40 year	181	69,6
		41-65 year	79	30,4
2	Level of education	Primary school	23	8,1
		Junior high school	57	26,4
		Senior High School	99	37,6
		College	81	30,8
3	Knowledge	Less	157	59,7
		Good	103	39,2
4	Income	Low Income (\leq Rp 2.085.000)	171	65,8
		Higher Income ($>$ Rp 2.085.000)	89	34,2
5	Perception	Low	78	30
		High	182	70
6.	Motivation	Low	148	56,9
		High	112	43,1
7.	Socialization	Not	136	52,3
		There is	124	47,7

Based on table 1 can be seen that of 260 respondents consisted of 18-40 (adult) age range 181 respondents (69.6%) and respondents with age range 41-65 (old) as much as 79 respondents (30.4%). Respondents can be seen in this study more than the range adult, this is because respondents with age range 18-40 is still productive and have a job. High school education level has the highest percentage (37,6%) this matter because respondents in this research is participant by JKN independently which majority is entrepreneur. Of the 260 respondents, 157 respondents (59.7%) had less knowledge about JKN. Based on the results of the questionnaires of respondents who have less knowledge due to the respondents do not know the benefits obtained when a participant JKN as many as 155 people (97.4%), who do not know who is required to become a participant JKN as many as 155 people (97.4%), (94.7%) who do not know the purpose of BPJS Health (94.7%), who do not know the participants JKN consists of as many as

153 people (94.7%), who do not know the purpose of JKN as much as 153 people (94.7%) , who do not yet know the number of JKN participants as many as 151 people (92,1%), who do not yet know how to register become JKN participants for PBPJ counted 145 people (86,8%), not yet know the procedure of registration of JKN as many as 122 people (73, 7%), who do not yet know the requirements to become a participant of JKN for Indonesian citizens are 95 people (68,4%).

Income low (\leq Rp 2,085.000) more reported on the type of work in the informal sector with uncertain income each month. Concerned perceptions, 80 respondents (30.7%) assume that the facilities provided if the illness is incomplete, as many as 120 respondents (46%) assume that BPJS is only for the poor. Respondents have low motivation caused by those who say that does not agree that the way of registration as JKN participants is easy.

Table 2. Bivariate Analysis

Variable	JKN Independently Active Participation				p-value	OR (95% CI)
	Not a Participant (Control)		Participants (Case)			
	n	%	n	%		
Age					0,059	1,337 (0,991-1,802)
Adult (18-40 tahun)	98	75,4	83	63,8		
Old (41-65 tahun)	32	24,6	47	36,2		
Level of education					0,000	0,16
Low	17	13,07	63	48,46		
High	113	86,92	67	51,53		
Knowledge					0,000	6,3 (3,59-11,02)
Less	105	80,8	52	40		
Good	25	19,2	78	60		
Income					0,067	0,597 (0,35-1,00)
Low (\leq rp 2.085.000)	78	60	93	71,5		
Higher ($>$ rp 2.085.000)	52	40	37	28,5		
Perception					0,000	3,50 (2,78-4,40)
Low	130	100	52	40		
High	0	0	78	60		
Motivation					0,000	8,22 (5,33-12,6)
Low	130	100	18	13,8		
High	0	0	112	86,2		
Socialization					0,00	8,70 (4,97-15,243)
No	100	76,9	36	27,7		
There is	30	23,1	94	72,4		

Based on table 2 above, the result of chi-square test with 95% confidence level, there is a significant influence, level of education (P-value=0,000), knowledge (0,000), motivation (0,000), perception (0,000) and socialization (0,000).

Table 3 Results the initial model of multiple logistic regression analysis

No	Variabel	B	Sig	Exp(B)
1	Age	2.283	0.023	9.807
4	Level of education	-2.270	0.019	0.103
3	Income	0.235	0,749	1.265
4	knowledge	1.869	0.021	6.483
5	Perception	-19,181	0,996	0,000
6	Motivation	-22,248	0,994	0,000
7	socialization	1,422	0,061	0,938

Table 4. Results of final model of multiple logistic regression analysis

No	Variabel	B	OR	95% CI OR	P value
1	Age	2.283	9.807	1,129-69,423	0.023
2	Level of education	-2.270	0.103	0,174-11,392	0.019
3	Income	0.235	1.265	0.299-5.344	0.749
4	knowledge	1.869	6.483	1,428-35,972	0.021
5	Perception	-19,181	0,000	0,000	0,996
6	Motivation	-22,248	0,000	0,000	0,994
7	socialization	1,422	0,938	0,880-16,113	0,061

Based on table 4 can be seen that the most influential variable is age, meaning that the more mature one's age then 9.8 times have the opportunity to become participants of health insurance independently.

Discussion

Based on table 2, to see the effect of age on JKN membership independently that, p-value= 0,059, means there is no significant influence between age with JKN membership independently.

The results of this study is supported by the results of previous research by Widhiastuti (2015) which states there is no significant influence between age with public awareness in insurance. Research with similar results was also revealed by Anggi Afifi (2014)⁴. In this study sampling was conducted only in primary health care, so there was no significant difference in health risks between respondents aged <40 years and ≥40 years,

where they were more likely to experience low health risks⁶.

Education of the 130 respondents who are not independent JKN participants, there are 113 respondents (86.9%) have high education level, while JKN membership comes from education level ≤ junior high school and college level only 24.6% and 26.9% which means lower levels of education are more likely to choose to be JKN participants. From these findings it can be seen that the level of education has no effect on knowledge. In addition, respondents with low level of education have concerns in terms of income due to their low employment rate (traders) as much as 218 respondents (82.9%). The effect of education with JKN participation independently, p-value=0,000, which means there is a significant influence between education with JKN membership independently. The value of OR=0.16 indicates that a person with a low educational

level is 0.16 times more likely to be an independent JKN participant than someone with a higher level of education. The results of this study in line with the results of research conducted by Siswoyo BE (2015) there is a relationship between the type of work with the awareness of being a participant JKN. Respondents with unpredictable jobs and income are more interested in becoming JKN participants to ensure their health⁷.

The effect of JKN self-knowledge and membership, that p-value = 0,000. The OR score indicates 6.3 which means that respondents who have high knowledge about JKN independently will have 6.3 times more chance to become independent JKN participants compared with those who have less knowledge about JKN. The results of this study in line with the results of research Tanjung (2015) there is a meaningful influence between knowledge with attitude JKN independent participation. Respondents' knowledge of JKN includes understanding, understanding of participants regarding BPJS, JKN, JKN membership and benefits gained⁸.

As many as 71.5% of JKN participants came from respondents who have income \leq Rp.2.085.000, whereas respondents who have total income $>$ Rp.2.085.000 per month only 28.5%. Based on the findings in the field of respondents with income of \leq Rp 2,085,000, more are based on the types of jobs in the informal sector with uncertain income each month. Uncertainty about income is what affects a person to ensure his health by deciding to become a participant of JKN, another factor high income level of income is found to be meaningless. The researcher's assumptions are caused by the National Health Insurance program is a social health insurance, in which membership is mandatory for all Indonesians in meeting basic health needs. The implementation of this program has been adapted to the economic capacity of the people. This research is in line with the Whidiastuti (2015) study which stated that the respondents' income in this study did not affect the JKN participation independently⁴.

Perception is very closely influenced by perceived benefits. Based on the theory of Kurt Lewin (1951) that changes in one's behavior is influenced by the driving factors and inhibiting factors. When a person's perception of a program's benefits is high, it will be said to be a driver toward the desired goal. This drive will be strengthened if the perception of resistance as an inhibiting factor is found low, then the behavioral change

toward the desired goal will be faster. The results of this study in accordance with the Health Belief Model where the change in behavior in respondents is influenced by the belief of the benefits or obstacles perceived. High perceptions of benefits and the discovery of low barriers of perception will lead to changes in respondent behavior⁹.

There is a significant influence Motivation on JKN independently membership. The OR score indicates 8.22 which means that a person with high motivation has an opportunity to become a JKN participant compared to someone with low motivation. This research is in line with the results of Hardini's (2016) research, motivation related to the participation of the national health insurance program because of the ease of registering, socialization, information received, the availability of health facilities, the health costs covered, and the protection of old age¹⁰.

P-value = 0,000. There is an influence of JKN socialization on independent participation. Based on the table can be seen from 130 respondents who are not independent JKN participants, there are 100 respondents who have never received socialization related to JKN. Based on the findings in the field, respondents who are not independent JKN participants claimed to have never received socialization directly by the BPJS Amuntai Branch. In addition to direct socialization, respondents also have not received socialization through other media (print or electronic). Based on table 5.1.4 shows 59% of respondents have knowledge about JKN is still low which means still lack of socialization about JKN. Another thing is because most of the respondents who are not independent JKN participants are informal workers / SMEs. This is in line with research conducted by Fajar (2012) on MSME workers who get information that the respondents only know the program JKN as much as 21%, while those who do not know 62%. This indicates that massive socialization of the program is still needed, especially for the lower middle class, working in the informal sector and MSMEs¹⁰.

Conclusion

1. There is no influence of age, income of respondents to the participation of National Health Insurance independently in Sungai Malang Primer Health Care
2. There is influence of educational level, knowledge, perception, motivation and

socialization of National Health Insurance participation independently in Sungai Malang Primer Health Care.

3. The most influential factor of logistic regression analysis is age to the participation of National Health Insurance independently in Sungai Malang Primer Health Care

Ethical Clearance: this study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participant's right, confidentiality and signature.

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**THE INFLUENCE BETWEEN FINANCIAL COMPENSATION AND
INTERPERSONAL COMMUNICATION TO WORKING STRESS OF
NURSES****(Analytic Observational Study at Inpatient of Ulin Hospital, Banjarmasin,
Indonesia)****Fitria Dewi Puspita¹, Mohammad Isa² and Syamsul Arifin³**¹*Master of Public Health, Faculty of Medicine, Lambung Mangkurat University*^{2,3}*Faculty of Medicine, Lambung Mangkurat University*

Abstract— Working stress is susceptible happened to hospital workers such as nurses. This is caused by organizational factors such as financial compensation or individual factors which is relate with job dissatisfaction such as interpersonal communication. This research did to know the influence of financial compensation and interpersonal communication to working stress at nurses of inpatient room in Ulin Hospital Banjarmasin. This research used an analytic observational research with cross sectional design. The population of this research are all nurses at inpatient room Ulin Hospital Banjarmasin, while sampling used proportional sampling. The research variables are financial compensation and interpersonal communication as independent variable and working stress as dependent variable. The research instrument used in this study is check list of spreadsheets and questionnaires. The result of the multiple logistic regression analysis show the result of p-value sequencely 0.000 and 0.009 ($p < 0.05$), with Exp B value of interpersonal communication is the largest 3,821. There was an influence between financial compensation and interpersonal communication to working stress of nurses in inpatient room at Ulin Hospital Banjarmasin.

Keywords— Financial compensation, interpersonal communication, working stress, nurse

I. INTRODUCTION

The nurse was one of the health workers who play a role in a hospital, especially on inpatient services as a place of interaction between patients with various personality traits and diseases suffered. Nurses on duty in the inpatient room often interact in patients with various personality traits and diseases suffered. Complaints of patient diseases that never recover, complaints or demands of the patient's family, co-workers who are not aligned and arrogant tend to make the nurses experience physical, emotional and mental fatigue that causes the nurse to experience work stress [1, 2].

Working stress was a condition of a tension that affects the emotions, thinking processes and physical conditions of a person. Stress that is not addressed properly can result in the inability of a person to interact positively with the environment, both in the work environment and social environment, decreased job performance and worsen service to patients [3, 4, 5, 6]. The survey results by Self Work-related Illness (SWI) in Eroupen Agency for Safety an Health at Workshow in 2004, nurses have a higher prevalence of high stress related to work, it is in line with the survey underscored by Indonesian National Nurse Association in *Coping Nurses Journal* that there were about 50.9% of nurses meet the working stress in four provinces. According to the National Safety Council theory, it wais due to causes such as the organization of financial compensation, cause individuals associated with job dissatisfaction as interpersonal communication and environmental causes [7, 8, 9, 10].

Ulin Hospital Banjarmasin is the largest hospital in South Kalimantan and as a referral center hospital in South Kalimantan, Central Kalimantan and East Kalimantan. Therefore Ulin hospital is a solid and trouble-packed place. Based on the results of the inpatient satisfaction index survey that is associated with Minimum Service Standards in 2011-2015 at Ulin Hospital Banjarmasin which

stipulates the index of inpatient satisfaction index of 80 and the average value of service 80.00 is obtained results that in 2014 index number Satisfaction of inpatient patient is equal to 72.71, whereas in 2015 the patient satisfaction index index is 70.57. Based on the results of the inpatient satisfaction index survey that is associated with Minimum Service Standards in 2011-2015 that the index of patient satisfaction inpatient services is still low and has not reached the expected target and there is a decrease in the index of inpatient satisfaction index in 2015. The patient satisfaction index Inpatient by 2015 which has the lowest inpatient service value ie officer ability and courtesy officer [11].

According to The Regulation Number 36 Year 2009 about Health that the healing of illness and restoration of health is done by control, medication and or treatment. Nurses who are work in an environment that is required to be responsible for determining the quality and safety of patient care. If the nurse experiences the working stress and the stress is not properly managed it will endanger the patient. If most of nurses experience the working stress, it can disrupt hospital performance because nurses can not provide the best service for hospital and ultimately affect competitiveness and may endanger the organization's organization [12].

The influence of working stress toward working performance and identification of stress management used by nurses in Ulin Hospital, showed that nurse job stress level with high category was 4.7%. The nurse's perceived stressors vary considerably, while the second-largest stressor perceived by the nurse is an unfair wage of 57.9%. Further research by Fakhshanoor in 2012 in the Journal of An-Nadaa that there were 60% of nurses in Ulin Hospital ICU room, ICCU and PICU room have medium working stress. The bad impact of working stress that nurses can cause was to interfere with social interaction, both with colleagues, doctors and patients. The effectiveness can also be disrupted because in general if a person experiencing work stress will occur psychological disorders and physiological conditions [13].

Compensation affect the nurse performance satisfaction. The higher the compensation the nurse receives, the higher the job satisfaction the nurse will feel. Based on Zulkarnaen, working stress is influenced by the compensation given, because compensation greatly affects the welfare standard. Financial compensation is one of the most important roles in improving performance and one of the most effective ways to improve work motivation. One of the main reasons a person works is to meet the basic needs of life so that someone will work optimally to get the appropriate compensation. If the financial compensation given is appropriate and appropriate will make job satisfaction on nurses who can boost the spirit and reduce the working stress so that show performance and good performance that will eventually increase work productivity [14, 15].

There was a very significant relationship between interpersonal communication with working stress. The nurses who experience the working stress will greatly affect the quality of nursing services provided to patients, leading to decreased work effectiveness, lowering social relationships among colleagues, and negative feelings to patients, work and the workplace. If this is left unchecked and no comprehensive identification can lead to a decrease in the quality of care and the reduction of the nurse's image [16].

Therefore, it is necessary to conduct more in-depth research on the effect of financial compensation and interpersonal communication on working stress of nurse in inpatient room at Ulin Hospital Banjarmasin.

II. METHOD

This research is observational analytic quantitative research with cross sectional approach. The population in this study were all nurses on inpatient room in Ulin Hospital Banjarmasin of 331 people, while the samples are taken using the proportional method of sampling as much as 83 respondents.

The independent variables comprise financial compensation and interpersonal communication. The dependent variable in this research is work stress. The research instrument used in this research is the checklist and the questionnaires that have tested the validity and reliability. The research data is then processed and univariate, bivariate and multivariate analysis.

III. RESULT AND DISCUSSION

Table 1. The Result of Research about Financial Compensation

Financial Compensation	Salary		Incentive		Allowance	
	N	(%)	N	(%)	N	(%)
Low	38	42	34	38	64	71
High	52	58	56	62	26	29
Total	90	100	90	100	90	100

Table 2. The Result of Research about Interpersonal Communication

Interpersonal Communication	Amount	Percentage (%)
Not good	41	45.6
Good	49	54.4
Total	90	100.0

Table 3. The Result of Research about Working Stress

Working Stress	Amount	Percentage (%)
Low	47	52.2
High	43	47.8
Total	90	100.0

Table 4. The Relationship Between Financial Compensation to Working Stress

Financial Compensation	Working Stress		Total	<i>p-value</i>
	Low	High		
Low	13	29	42	.000
	31%	69%	100%	
High	34	14	48	
	70.8%	29.2%	100%	
Total	47	43	90	
	52.2%	47.8%	100%	

There was an influence of financial compensation to working stress of nurse at Ulin Hospital Banjarmasin. The results can be seen that low financial compensation with high working stress of 29 respondents (69%). Based on these results it was known that respondents with low compensation have high work stress. The data based on the results of research majority of respondents are known to enter the age of early adulthood.

Based on these results can be seen also that the respondents with high financial compensation still occurred high working stress of 14 respondents (29.2%). The majority of respondents are in the first class, early adulthood, female gender, work less than 10 years and diploma III educational status.

There was an influence of financial compensation to work stress of nurse at inpatient room Ulin Hospital Banjarmasin. This shows that with good financial compensation can provide a lower level of stress in comparison with low levels of financial compensation can lead to high levels of stress. Based on the research data, the majority of respondents are known to enter the age of early adulthood, female gender, Diploma III education status, working period less than 10 years and in inpatient room.

Early adult age was known to experience more stress than late adulthood, it was because the ability to overcome problems in early adulthood is usually not mature enough, tend to be depressed. In early adulthood was usually less able to adapt the desires with the reality that exists within himself and outside himself. All kinds of stressors were basically caused by a lack of understanding of its

limitations, a person with early adulthood was usually appreciation and interpretation of the pressures tend to be exaggerated so perceive as a stressful situation. In the early adulthood changes such as efficiency, health and physical strength reach the peak, the psychic arises desire and consolidation efforts such as expectation to get results such as getting high compensation, but because it was not in accordance with the desire often experience emotional tension because of the complexity of the problem [2, 17].

The results of research data obtained the majority of sex respondents were women with low financial compensation tend to experience the high of working stress compared with men. In women many triggers the occurrence of working stress such as conflict between the dual role in taking care of the family with his job. Maslach states that women who experience burnout tend to experience emotional exhaustion because women can experience a conflict between the dual role of family care and help patients in a professional who has become a responsibility. The dual role in a female nurse is one of the effects of burnout, women chose to be a career woman to please parents because it has been financed during a lecture, for nurse married women chose to work to help meet the needs of tertiary family because it is not enough if only rely on income from their husband [2].

The rewards of services include salary, allowances and incentives received perceived nurses to be the cause of stress, mental fatigue caused by financial factors that are low income and unfair pay. Salary is sometimes felt to be a burden on the mind, in addition to the salary received perceived not sufficient because the needs of everyday life increasingly occur such as food needs, clothing, housing and increased fuel oil and transportation costs [18].

Compensation is one of the implementation of human resource management functions related to all kinds of individual award giving as exchange in performing organizational tasks [19]. Work stress is influenced by the compensation given, because compensation greatly affects the welfare standard [15]. Compensation is one aspect that needs to be considered in hospital management, nurses are profession with high performance and skilled to perform service to patient. Patient involvement requires nurses to work with high concentration and caution can make job stress on the nurse, hence attention is needed to increase prosperity for nurse [20]. While, Bariball and Harris say the lack of income at work can be a major source of stress and low salaries significantly also affect the stress level in the workplace [21]. The results of the study by Igalens and Rousell; Nawab and Batti; Sharma stated that the satisfaction of salary to be a proof as a driver to increase job satisfaction. Appropriate compensation will provide stimulation and motivation to provide the best performance and generate optimal work productivity [14].

Based on these results it was also known that the respondents of low financial compensation with high work stress majority in the ward space. The working environment of the nurse's place of duty can affect the work stress result, besides facing the condition of the long-treated patient, the nurse must also face the family and relatives of the patient waiting to get room in the room. Nursing is a stressful job, with direct contact with a variety of work environments and anxiety and depression. The work load increases depending on the location and the part where the nurse works and the number of patients in the room can cause work stress on the nurse [22].

In this study, light workloads are more docile in documentation if compared to heavy workloads. The low performance of nursing services related to the workload. Workloads that are not in accordance with the duties and functions of nurses based on nursing [23].

Table 5. The Relationship Between Interpersonal Communication to Working Stress

Interpersonal Communication	Working Stress		Total	<i>p-value</i>
	Low	High		
Not Good	16	25	41	.037
	39%	61%	100%	
Good	31	18	49	
	63.3%	36.7%	100%	
Total	47	43	90	
	52.2%	47.8%	100%	

Based on the result that $0.037 < 0.05$, the decision is H_0 rejected which means there was an influence between interpersonal communication to the working stress of nurses at Ulin Hospital Banjarmasin. The results can be seen that interpersonal communication is not good with high work stress of 25 respondents (61%). Based on these results note that respondents with interpersonal communication is not good to have high work stress.

Based on these results can be seen that the respondents with good interpersonal communication still high work stress occurred by 18 respondents (36.7%). Based on the result, the majority of respondents with interpersonal communication both with high of working stress with Diploma III education status, early adult age, female gender and tenure of less than 10 years.

There was an influence of interpersonal communication to working stress of nurses at inpatient room Ulin Hospital Banjarmasin. The results can be seen that interpersonal communication is not good with high work stress of 25 respondents (61%). Based on these results note that respondents with interpersonal communication is not good to have high work stress. Based on the research data, the majority of respondents were early adulthood, female gender, Diploma III education status, working period less than 10 years and in firstclass and inpatient room.

The results of research data obtained the majority of sex respondents are women with low interpersonal communication tend to experience the high of working stress compared with men. In women many triggers the occurrence of work stress such as conflict between multiple roles in taking care of the family with work, menstrual disorders when experiencing premenstrual syndrome in women who can increase emotional disorders such as mood swings and mental changes. Hormonal influences that can increase emotionally in women are usually at the time of premenstrual syndrome (PMS). PMS is a collection of physical, psychological and emotional symptoms associated with the menstrual cycle that occurs 7-10 days before menstruation. It can improve the emotional disturbance of the subject such as mood swings (excessive sensitivity 2 weeks before menstruation, irritability, dizziness, anxiety, irritability) and mental changes (difficulty concentrating and forgetful) [2, 24].

Based on the results that the majority of respondents with low interpersonal communication with the high of working stress have Diploma III education status. It was happen because the number of recruitment at the hospital more with the qualification of Diploma III Nursing level. The level of education will affect the quality of work, resulting in the work to be increased and cause stress [17].

Good interpersonal communication can provide a lower level of stress in comparison to low levels of interpersonal communication can lead to high levels of stress, so a good relationship between colleagues can prevent or reduce the nurse's stress level in the workplace because of the mutual trust between colleagues Work and the existence of mutual openness so that two-way communication between colleagues can take place both and create comfort in work [18].

There was a very significant relationship between interpersonal communication with working stress on paramedical staff, while the relationship was negative which means the higher one's interpersonal communication, the lower the working stress of paramedical staff [16]. Sometimes relationships with colleagues become job stressors. Not only interpersonal communication among colleagues alone can lead to high levels of work stress, interrupted or low interpersonal communication with the head of the room or *atasanya* in the hospital is more high due to high levels of work stress and this can not be avoided because it is always in touch and meet every day [18].

This is in accordance with Gibson which states there are several factors causing or stressors that one of them is poor interpersonal communication can also result in an employee experiencing work stress [16]. This opinion is consistent with the opinions of experts Bailey, Steffen and Grout; Gray Toft and Anderson stated that conflicts with doctors, lack of support for staff, conflicts with other nurses, difficulty dealing with other nurses and medical staff were a source of stress for nurses in performing their duties [18].

Interpersonal communication is a relationship consisting of two or more people who are interdependent with each other by creating interest and capturing attention, building sympathy, confidence, honesty and empathy, optimism and applying the ability to ask, listen and be silent. Interpersonal communication is a glue of togetherness in the organization to achieve the vision and mission to coordinate the activities of the organization and direct the behavior expected by the organization. Interpersonal communication within an organization that is effective in providing clarity

of information can make it easier for nurses to pay attention to prioritized things in the organization. While communication is not effective in the organization becomes one of the factors of conflict [25].

If the organization of a prolonged conflict led to ineffective communication and became one of the obstacles to the success of performance and can be a cause of stress. Nursing services are required to make a good relationship or cooperation between the parts and personnel involved in the service. Coordination of nursing services requires an open and effective communication that is felt by all who are involved in the ministry. Interpersonal communication within the organization is important because it relates to employee job satisfaction [25].

Paramedic employees who experience ineffective interpersonal communication in their work tend to be negative, such as feeling anxious and unable to understand the patient's complaints properly, The existence of limitations in the ability to complete the task and the ability to overcome problems and lack of support from colleagues will cause work stress [16]. Good relationships and no conflict with colleagues can prevent stress on nurses. In addition, good relationships between fellow nurses, between other health workers and based on trust, mutual respect, sharing in knowledge, skills and mutual help will optimize in the care of patients. With better interpersonal communication relationships the more open someone reveals himself, so the more effective interpersonal communication takes place [26].

Table 6. p-Value of Each Variables

Variable	p-value
Financial Compensation	.000
Interpersonal Communication	.023

Based table on the above, a p-value of variable financial compensation for 0000 <0:25 and a p-value of 0.023 interpersonal communication variables <0:25, which means that the two variables are worth going into multivariate analysis with logistic regression.

Table 7. Multivariat Analysis

Variable	Wald	Sig.	Exp B	CI 95%	
				Lower	Upper
Financial Compensation	14.529	.000	.144	.053	.390
Interpersonal Communication	6.917	.009	3.821	1.407	10.378

There was are the variable that most influence on work stress that interpersonal communication with a p-value 0.009 > 0.05, and the value of Exp B The largest obtained is 3,821 means that interpersonal communication of respondents have a chance of 3,821 times the cause of work stress.

Multivariate statistical test results using multiple logistic regression in this study showed that there was an influence between financial compensation and interpersonal communication to working stress of nurses at Ulin Hospital Banjarmasin. A p-value variable financial compensation for 0000 <0:25 and a p-value of 0.023 interpersonal communication variables <0:25, which means that the two variables are worth going into multivariate analysis with logistic regression. The variable that most influence on work stress that interpersonal communication with a p-value 0.009 > 0.05, and the value of Exp B The largest obtained is 3.821 means that interpersonal communication of respondents have a chance of 3.821 times the cause of working stress.

Interpersonal communication is an important role in an organization because every time nurses will interact. So if interpersonal communication is disturbed (less communicative) there will be distrust of colleagues and head of the room or leadership and result in increased occurrence of excessive work stress so that there can be disputes or conflicts and this results in nurse focuss in the work. That's why interpersonal communication is more influential than interpersonal compensation on nurses in Ulin Hospital ward. The results can be seen that low financial compensation and interpersonal communication is not good with high work stress of 14 respondents (78%). Based on the data of the research, the majority of respondents are known to enter the age of early adulthood, female sex, tenure ≤ 10 years, in the ward room with Diploma III education status. In early adulthood

known to experience more stress than the late adult age, it is because the ability to overcome problems in early adulthood is usually not mature enough, tend to be depressed. In early adulthood is usually less able to adapt the desires with the reality that exists within himself and outside himself. All kinds of stressors are basically caused by a lack of understanding of its limitations, a person with early adulthood is usually appreciative and interpretation of the pressures tend to be exaggerated so perceive as a stressful situation [2, 17].

Based on the results of research known that women with low interpersonal communication tend to experience high work stress compared with men. In women many triggers the occurrence of work stress such as conflict between multiple roles in taking care of the family with work, menstrual disorders when experiencing premenstrual syndrome in women who can increase emotional disorders such as mood swings and mental changes. Hormonal influences that can increase emotionally in women are usually at the time of premenstrual syndrome (PMS). PMS is a collection of physical, psychological and emotional symptoms associated with the menstrual cycle that occurs 7-10 days before menstruation. It can increase the emotional disturbance of the subject such as mood swings (excessive sensitivity 2 weeks before menstruation, irritability, dizziness, anxiety, irritability) and mental changes (difficult to concentrate and forgetfulness) [2].

The result of the research is known that the majority of education status of respondent is Diploma. Based on these results known to respondents with Diploma III education status experienced more work stress than respondents with Bachelor education. This is because the higher a person's education the more knowledge obtained so that it will be better able to cope with work stress that occurs in him compared with a low-educated person. Lack of knowledge in dealing with workplace problems can lead to work stress that leads to low performance, poor communication, bad decisions, less creativity and innovation so as to grapple with unproductive tasks [17, 22].

In addition, based on the results of the study the number of respondents with a working period of ≤ 10 years known that with a short tenure more stress than respondents with long service. The study by Sartika shows that respondents who have low employment are more likely to experience high work stress (Irkhami, 2015). Nevertheless based on the data of research results known the number of respondents with the working life > 10 years is not much different from the number of respondents working period ≤ 10 years. The nurse with age > 10 years of giving effect to the maturity of experience of nurses in the room, but it does not necessarily have coping with stress is good, if too long can lead to boredom, especially when less pleasant work environment then this condition will cause stress. Therefore, various training on burnout on the subject so that the subject has a strategy of coping with stress are considered to be effective in dealing with situations of stress triggers. Coping is defined as the process of someone to manage or adjust the perceived mismatch between demands and resources of their votes in a stressful situation [27].

Based on these results also note that respondents with high financial compensation is still going high job stress by 14 respondents (29.2%). The majority of respondents are in the orchid "firstclass" room. Based on field data on the density of the patient rooms very much, besides the inpatient room tesebut most in demand by patients so that almost all the vacant space is never filled with patients. Work environment where nurses on duty can affect the results of the stress of work, in addition to facing conditions that have long treated patients, nurses also have to confront the family and relatives of patients awaiting want to get a room in the room. Nursing is a job that can be stressful, with direct contact to the environment and working conditions that lead to anxiety and depression. Increased workload depends on the location and section where the nurse works as well as the number of patients in the room can cause work stress in nurses [22].

Werther and Davis defines as any compensation received by workers in exchange for his contribution to the organization. This is consistent with the results of Soep research shows that remuneration received by nurses perceived to be the cause of stress such as the amount of salary, benefits and incentives. However, despite the perceived lack of appropriate compensation for services is still a motivating factor for the relationship with colleagues and leaders [18, 28].

Based on the distribution of the questionnaire answers interpersonal communication as much as 21 respondents (23.3%) got three highest states answer is always open, social support and have a positive sense when making interpersonal communication. According to Rook, individuals who have high social support can reduce the effects of job stress that harm. Social support from co-workers

were able to create a sense of comfort, serenity and psychological well-being increases because of the caring and understanding, giving rise to a feeling of belonging, enhance self-esteem and clarity of self-identity and have positive feelings about yourself in the work so that someone who get social support can focusing his attention [29].

According to Dessler, the useful relationships, pleasant and cooperative with colleagues can reduce the pressure of work. Social support has been shown to reduce stress among individuals at work, while social support can take the form of emotional support, the support ratings and support information such as giving advice, suggestions and guidance. Social support refers to emotional support, instrumental and financial obtained from a person's social network. Social support is a psychological and emotional comfort given to individuals by family, friends, colleagues and others that affect a person's health by providing protection against causes of stress [30, 31].

IV. CONCLUSION

1. There was an influence between financial compensation to the working stress of nurse at Ulin Hospital Banjarmasin.
2. There was an influence between interpersonal communication to the working stress of nurse at Ulin Hospital Banjarmasin.
3. There was an influence between financial compensation and interpersonal communication to the working stress of nurse at Ulin Hospital Banjarmasin.

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